

# MINNESOTA MEDICINE

*Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association  
Northern Minnesota Medical Association and Minneapolis Surgical Society*

VOL. VII

MARCH, 1924

No. 3

## ORIGINAL ARTICLES

### CUTANEOUS TUBERCULOSIS AND TUBERCULIDS IN DIAGNOSIS\*

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In the time allotted me it is of course impossible to review for you, all the varied reflections of tuberculosis in the mirror of the skin. So extensive a structure as the skin, so large an organ, one might say, with its enormous capillary circulation acting as a strainer for both organisms and toxins, must, in spite of its relative stability and resistance to internal and external attack, frequently register the onset and course of tuberculous infection. The extraordinarily wide range and clinical variety of these lesions have received monographic consideration in the writings of such observers as Jadassohn, Brocq and others, but in American literature has a comparatively restricted notice. Part of this lack of attention is, I believe, the result of general unfamiliarity with dermatology on the part of even our most alert diagnosticians. A wider acquaintance would soon extend the field of our first-hand knowledge of tuberculosis as it affects the skin, and would increase our appreciation of its value as an aid in the diagnosis of systemic disease. With this idea in mind I take this opportunity to call to your attention four aspects of cutaneous medicine in which tuberculosis plays a leading part, and to emphasize particularly the diagnostic earmarks by which the general practitioner, no less than the expert, may have his suspicions aroused and be led to fuller study and observation and to eventual accurate diagnosis.

#### THE APPLE-JELLY NODULE AS AN EARMARK IN CUTANEOUS TUBERCULOSIS

The accessibility of the skin to visual examination makes it possible to do in life what unfortu-

nately is denied us in tuberculosis of deeper structures, to see the tubercle in situ, by the very simple device of expressing the blood supply from the inflamed surrounding tissue by glass pressure. While tubercles do not differentiate sharply in certain types of cutaneous tuberculosis, in others are too deeply situated for observation, and in still others are usually prevented from forming by the violent destruction of tissue and organisms in an allergic



Fig. 1 (Case A187333). Early lupus vulgaris of the tip of the nose. Apple jelly-nodules demonstrable on pressure by glass slide. The preliminary diagnosis was "frost bite." Local and general reaction to tuberculin.

local tissue reaction, the cutaneous tubercle is common enough in processes such as lupus vulgaris, of the ulcerative type, in the dry lupus vulgaris erythematoides, and in certain forms of inoculation tuberculosis, to make its identification helpful in differentiating the tuberculoma from other granulomas and non-granulomatous processes.

\*Read in symposium before the Minnesota State Medical Association, October 10-12, 1923, St. Paul.

The cutaneous tubercle or apple-jelly nodule is a small translucent brownish or apple-jelly colored infiltration, rarely more than 2 or 3 mm. in diameter, entirely invisible against its inflammatory background until the blood has been expressed from the surrounding tissue by pressure from some transparent object (Fig. 1). A glass slide, a glass tongue depressor or pleximeter, or an unmounted biconvex lens may be used. Even a glass paper-weight or the side of a tumbler may be utilized for emergency observation. The glass object must be stout enough to permit of a fairly firm pressure without breaking, or a severe cut may be inflicted. In a lesion which is markedly scaly or crusted, the surface should be carefully cleaned of detritus, so that no confusion from surface matter may occur. The tubercle is in the skin, not on it, almost perfectly round, flattened somewhat by the pressure, and rarely solitary. A group or chain is common, and a lesion in which only a single nodule occurs cannot thereby be proved tuberculous. Not infrequently in cases in which the local reaction to the infection is slight, as in dry lupus vulgaris, the fawn brown of the gross lesion first arouses suspicion, and when on pressure this color persists in spite of the pallor, and discrete small brownish nodules can be made out, tuberculosis is a strong presumption.

Of the conditions in which one would be likely to use this differential criterion, epithelioma and syphilis are most likely to simulate tuberculosis. Epitheliomatous cell nests are typically pearly nodules, not brown. They are usually confined to the border, rarely persisting in the scar as do tubercles. A definite telangiectasia can usually be recognized, which is not found in the avascular tubercle. The epitheliomatous "pearl" is harder, does not flatten so well under glass pressure, and shows more elevation above the surface of the skin, than a tubercle.

In late syphilids, especially about the face, the differential problem is often serious. Nicolas pointed out that the tuberculous apple-jelly nodule might be simulated by miliary gumma, and be present in syphilids of the skin which clinically resembled tuberculosis. In my experience, it is rare to see miliary gummas in considerable numbers as small as the average apple-jelly nodule. Larger nodules approaching 5 to 7 mm. are the rule. But even this criterion may fail in cases in

which nests of agminated tubercles have developed. The resemblance of a late syphilid of the face or nose to the dry erythematous, hypertrophic or even ulcerative type of lupus vulgaris may be so marked that pathologic differentiation by biopsy, by tuberculin subcutaneously, and by a therapeutic test must be resorted to in the effort to reach a diagnosis. In using the therapeutic test it is important to recall that arsphenamin has marked, though usually temporary, non-specific effects in cutaneous tuberculosis, and that even mercury intramuscularly may produce some clearing in a tuberculous lesion of this type.

In general, then, it is well worth while from the standpoint of general diagnosis, to apply glass pressure to the borders of indurated persistent plaques, small ulcerations, cutaneous nodules, and the

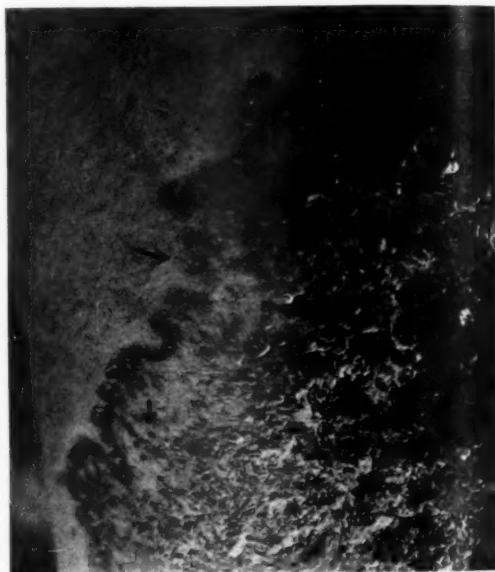


Fig. 2 (Case A256104). Lupus vulgaris erythematoides, the dry extensive non-ulcerative tuberculosis of the skin. Note the miliary tubercles in the border, two or three of them ulcerative, also the tubercles in the thin dry atrophic scar. They are easily demonstrable on glass pressure.

periphery of larger persistent patches of what may have been thought at first sight to be dry eczema, psoriasis and benign inflammatory conditions. A border of apple-jelly nodules, and the persistence of similar nodules in a dry atrophic scar (Fig. 2) may often lead to the diagnosis of a local tuberculous lesion in time to prevent metastasis or extensive destruction. A careful constitutional search

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may reveal a deep focus of the greatest importance to the patient's welfare.

#### LICHEN SCROFULOSORUM, THE TOXITUBERCULID

The term "toxituberculid" is being attacked from all sides, the contention being that cutaneous lesions heretofore regarded as simply concomitants of tuberculosis elsewhere in the body are gradually being shown by combined clinical and experimental

patch resembling an island of permanent goose-flesh. There may be horny plugging of the follicle mouths (Fig. 4) though this characteristic brings it perilously close in diagnosis to the confusing elements of lichen spinulosus, follicular lichen planus, lichen pilaris and keratosis follicularis. The follicular papule is practically non-inflammatory and of a flesh or yellowish tint, which helps to distinguish it from perifollicular seborrheic dermatitis, the follicular syphilid and keratosis pilaris and follicularis. Slight hyperpigmentation of the patch of skin affected is the rule, the pigmentation being definitely less than that usually associated with the follicular syphilid. The groups or patches are usually relatively few in number, occur on the flank or in odd places on the upper extremities, and are rarely so abundant, small and widely distributed as are the groups of the follicular secondary syphilid.

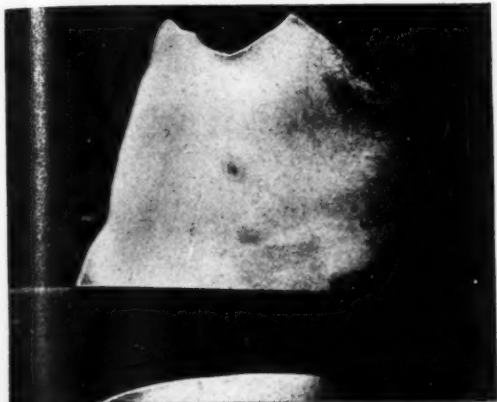


Fig. 3 (Case A319031). Lichen scrofulosorum on the flank in a young child. The patient came for a cleft palate operation and following a recognition of the lichen scrofulosorum, an examination for tuberculosis disclosed an extensive active infection with pulmonary manifestations.

study to be actual tuberculosis, caused by the organisms themselves and not by the effect of toxins from a remote focus. One type of lesion, however, seems thus far to have survived the effort to do away with the conception of toxituberculids, and that is the grouped follicular papular eruption known as lichen scrofulosorum which apparently can be produced experimentally by rubbing in tuberculin. This eruption has been regarded as a rarity in this country, though apparently common in Europe. Some of this rarity, however, may be the result of unfamiliarity.

In the clinical identification of lichen scrofulosorum, every one of the words used in the above designation of its characteristics is important. The eruption is grouped, not uniform or evenly distributed. Ten to fifty or a hundred papules are assembled into each close-set patch, and two or three up to fifty or more groups may be present (Fig. 3). The elementary lesion is follicular in character. The morphology of the follicular papule varies a good deal, especially in adults. It may be simply a follicular accentuation, the



Fig. 4 (Case A426165). Lichen scrofulosorum on the flank in a boy with what was at first thought to be the type of symmetrical hydrarthrosis of the knees, often seen in heredosyphilis. The identification of the cutaneous lesion led to a search which demonstrated the tuberculous origin of the process.

A follicular eruption presenting characteristics quite similar to those of lichen scrofulosorum has been recognized in recent years, and is of importance in differential diagnosis. This is the toxi-

trichophytid (Fig. 5) associated with a focus of trichophytic or ringworm infection, and especially with the macaroon-like crusted trichophytic granuloma known as kerion celsi. It is a grouped follicular eruption with a distribution and appearance suggestive of some cases of lichen scrofulosorum, but the ringworm lesion from which the intoxication is proceeding is usually easily identifiable. I have, however, seen it overlooked in the form of a patch of favus on the scalp, with favus of the nails. As in the case shown, it may consist merely of a superficial scaling trichophyte of the leg.

Lichen scrofulosorum has the reputation of being more common in children than in adults, but my experience has been the reverse of this. The lesion is apt to be more conspicuous in children, and therefore perhaps more often identified. I have observed it in association with pulmonary tuberculosis, and especially with tuberculous arthropathies, practically never with tuberculous glands, which are much more frequently accompanied by the papulo-necrotic tuberculid. A good light, a habit of critical inspection of the skin, ability to identify a follicular lesion, and some familiarity with the range of follicular lesion differentiation involved is essential. In city practice and on hospital staffs where dermatologic consultation is available, it often proves a valuable confirmatory aid in diagnosis, and may even, especially in children, set in motion an investigation which discovers an unexpected tuberculous focus.

#### DISSEMINATE ERYTHEMATOUS LUPUS, THE TUBERCULO-SEPTIC ERYTHEMA MULTIFORME

Lupus erythematosus is an unfortunate name, especially so because the term "lupus" leads the majority of physicians to associate the process with a true tuberculosis of the skin. To make a diagnosis of "lupus" is essentially meaningless, unless one specifies what "lupus" is meant. If one means cutaneous tuberculosis of a certain type he should say "lupus vulgaris"; otherwise he may find that he is confusing the condition with what is now regarded as in many cases a type of erythema multiforme, namely lupus erythematosus.

Lupus erythematosus presents two clinical types, the chronic discoid or localized form, and the disseminate type with systemic manifestations. The chronic type does not seem to be associated with tuberculosis in clinically recognizable form in more than about 30 per cent of cases, and for that

reason is not referred to here. The essential lesion of the chronic discoid type is a follicular inflammation with atrophy. The localization about the nose and face, forming the textbook butterfly pat-



Fig. 5 (Case A423734). The lichenoid trichophytid in a patient with a ringworm on the leg. This eruption may be confused with lichen scrofulosorum, but the trichophytic focus can always be found. Note the grouped follicular character of the eruption.

tern, is familiar to all. The frequent involvement of the scalp, producing patches of complete baldness from destruction of the hair follicles, is less familiar, and the common involvement of the outer anterior surface of the concha of the ear is also often overlooked. Acute disseminate erythematosus lupus may supervene on a chronic erythematosus lupus of many years' duration, or it may appear in obscure or full-blown form from nowhere. Whenever what seems to be a chronic erythematosus lupus can be identified on the face, or on the scalp, and purplish patches can also be found on the fingers or backs of the hands, or when the process on the face is extending downward onto the neck and arms, a menacing situation has arisen, and dissemination may be regarded as a possibility. The situation is menacing because while discoid lupus

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erythematous is usually merely disfiguring, disseminate erythematous lupus is a highly fatal disease with constitutional accompaniments that range all the way from imitations of typhoid fever, malaria, trichiniasis, acute rheumatic fever, and acute abdominal accidents, to cutaneous pictures suggesting erysipelas, exfoliative dermatitis and pellagra<sup>1</sup> (Fig. 6). In fact, repeated attacks of high fever in patients of low vitality, accompanied by any erythematous eruption (especially on the face), soreness of the mouth, falling of the hair (Fig. 7), arthritic symptoms, nephritis, or vague abdominal complaints, should prompt the most careful inves-

the tuberculous element in disseminate erythematous lupus, and its relation to the septic factor. Lymphatic tuberculosis, often of the mesenteric glands, and not recognized at times until necropsy, has figured prominently in our cases. The cross-fire of a tuberculous and a septic hypersusceptibility seems to underlie the peculiar clinical picture.

#### THE PAPULONECROTIC TUBERCULID

Lesions of the type of the papulonecrotic tuberculid, with its near relative, erythema induratum, are in my experience most valuable aids in general medical diagnosis, especially of glandular conditions; in the determination of the effectiveness of surgical procedure for the extirpation of a tuberculous focus, especially in glands; in the detection of a tuberculous factor in eye conditions and in the unravelling of obscure ill-health and asthenia in women. While the eruptive lesions themselves are frequently the occasion for the patient consulting the physician, they may, as in the papulonecrotic tuberculid of the face (acnitis), or that of the



Fig. 6 (Case A416047). Disseminate erythematous lupus simulating erysipelas and pellagra. The persistent edema and erythema of the face with alopecia with extension of the process onto the neck and the appearance of erythematous lesions on the hands is part of the cutaneous picture of the disseminating type of this disease.

tigation for disseminate erythematous lupus. This is especially important because death may follow promptly, either on the attempt to use tuberculin in diagnosis, or to remove a focus of infection in tonsils or teeth, or to explore surgically for some of the vague abdominal symptoms. The ultimate outlook is always grave, even with the best of management.

It is impossible in the time available to discuss



Fig. 7 (Case A364069). The alopecia of disseminate erythematous lupus which should not be confused with that of syphilis. This patient also had lesions in the mouth and on the hands suggesting pellagra. He died in a typical hyperpyrexial attack.

hands (folliclis) (Fig. 8), be disregarded as merely trifling annoyances and disfigurements, while the patient seeks relief for arthralgia, tenosynovitis, persistent anemia, amenorrhea, symptoms of pelvic



Fig. 8 (Case A228772). Papulonecrotic tuberculid on the fingers (folliclis). Note the papules with their central necrotic plugs and pits. The scars are quite characteristic. The lesions tend to localize at points of trauma. Over 90 per cent of papulonecrotic tuberculids occur on the extremities.

peritonitis and salpingitis, uveitis, retinal hemorrhages and vitreous opacities, supposed Hodgkin's disease, psoas abscess, "neurosis," or an occasional partial positive Wassermann reaction, with its accompanying diagnosis of syphilis.

To the best of our present knowledge, the appearance of the lesion known as a papulonecrotic tuberculid, means a tubercle bacilleamia, controlled by a hyperallergy on the part of the patient, which leads usually to the destruction of the organisms that reach the skin. This destruction is accomplished by a local inflammatory reaction which appears clinically as an inflammatory papule with a central necrosis. In those cases in which the tuberculosis bacilli are not entirely destroyed, tubercles and organisms may be found in the reacting tissue, especially in the condition known as erythema induratum.

It should be said at the outset that a septic, non-tuberculous factor is involved in the production of tuberculids and that the removal of such a septic focus may cause temporary or permanent improvement. One is therefore led at times to the belief that the true tuberculid may be closely imitated by what might be called a "septicid."

The close generic relation of tuberculids to erythema multiforme becomes very apparent on extended study, and any considerable clinical experience will furnish instances in which a transition from one to the other occurs, or in which erythema multiforme (Fig. 9), purpura and erythema nodosum serve as the prodromal indications of a tuberculous infection, or of the miliary dissemination of the organism with a fatal issue.

In the diagnosis of papulonecrotic tuberculids it is important to learn to identify the elementary lesion. Here again the name exactly describes it, at least in its maturity. At the outset, it is usually a hemorrhagic deep vesicle or an inflammatory nodule. On the hands and fingers, the vesicular phase is best seen; on the lower extremities and face, the nodular. The papular infiltration presently develops a central necrosis, which dries into a hard, brown to blackish plug, that can be dug out, leaving a superficial ulcer or a crateriform excavation (Fig. 8). During the development of this lesion the patient complains of tenderness on pressure which, if the lesion be on the finger, gives a sensation as of a thorn or splinter pressed into the flesh. In "stasis legs" and open lesions about



Fig. 9 (Case A217298). The clinical transition from erythema multiforme to a papulonecrotic tuberculid. This patient had a tuberculous salpingitis with erythema multiforme of the backs of the hands and folliclicular lesions of the tips of the fingers. Note the folliclicular scars on the right index finger.

the ankles the tenderness may be exquisite. In the normal course of events, the smaller papulonecrotic lesions heal slowly, leaving depressed atrophic scars, often round and varioliform, with a faint ring of hyperpigmentation. The absence of grouping in these scars is an important aid in differentiation from syphilis.

The appearance of papular lesions in clumps may result in coalescence on the lower extremities or large boggy plaques with central breakdown (Fig. 10) and a grumous discharge may appear without isolated papules, forming the clinical picture of erythema induratum of Bazin. The occurrence of a reddish tender plaque, or even several nodes in the calf or posterior surface of the lower leg of a young woman inclined to overweight, carries a strong presumptive diagnosis of erythema induratum and should lead to painstaking search for tuberculosis.

Tuberculids show an overwhelming tendency to localize to the dependent portions of the body, and are most often found on the arms, hands or legs. The blue, cold hand or foot ("vasomotor foot") is a common accompaniment, or perhaps better, predecessor of a tuberculid, and a careful search of blue and mottled fingers or feet often reveals the scars of lesions. Association with glandular tuberculosis in more than two-thirds of the cases, and a marked seasonal onset, with exacerbations in spring and fall, are important points. All patients with tuberculids should be searched for glandular

tuberculous foci. Roentgen rays of the chest are important. Conversely all patients presenting evidence of glandular enlargements should be searched for signs of a tuberculid. There is often no better



Fig. 11 (Case A234128). Characteristic scarring of the extensor surface of the forearms and elbows by a papulonecrotic tuberculid. Note the varioliform punctate depressed scars and the lack of any configuration which would suggest a syphilid. Note also a few active lesions with central plugs.

clinical check on a premature diagnosis of Hodgkin's disease or lymphosarcoma, than dermatologic consultation on small pimples, spots, and scars on face, fingers, and legs.

The sites which should receive special attention in a search for tuberculids are the fingers, especially those which are exposed to trauma, on which we may find the classical papulonecrotic lesions of so-called folliclis. The extensor surfaces of the forearms and elbows (Fig. 11) are often the site of typical symmetrical varioliform scarring and an occasional active lesion. Papulonecrotic lesions on the face should not be lightly dismissed as acne, which is nodular or pustular and accompanied by seborrhea and comedones, but seldom presents the necrotic plugged centers of the typical tuberculid (Fig. 12). An important point is the involvement of the external ear in papulonecrotic tuberculids (Fig. 12), giving rise in chronic cases to a shrink-



Fig. 10 (Case A218528). Papulonecrotic tuberculid with erythema induratum of the legs. The livid infiltrated plaque on the posterior surface is erythema induratum. These plaques often undergo ulceration. Young women who are overweight and have a tuberculous focus are predisposed to this condition. It may be closely simulated by an eruption of septic origin and should not be confused with varicose ulcer.

age and scarring of the lobe which I have described as "moth-eaten ear." Tuberculids about the face seem to be specially inclined to come in showers, and a shower of lesions may produce a picture ranging in differential possibilities from acne to



Fig. 12 (Case A257865). Acnitis, the papulonecrotic tuberculid of the face which is often confused with acne and the papular secondary syphilid. Note the occurrence of typical papulonecrotic lesions on the lobe and concha of the ear. The recurrence of these lesions produces the ragged or moth-eaten ear which is of assistance in diagnosis. Papulonecrotic tuberculids are associated in more than two-thirds of the cases with glandular tuberculosis. The response of these lesions to arsphenamin increases the possibility of confusion with syphilis.

variola and papular syphilis. Care should be taken not to regard the papulonecrotic lesions of acne necrotica, which are usually most abundant along the hair margin and in the scalp, as a tuberculid.

Confusion with syphilis is one of the commonest diagnostic errors arising in connection with papulonecrotic tuberculids. The undoubted occurrence with certain Wassermann technics of partial or even complete false positives on the blood in persons with tuberculids is important. The constitutional symptoms accompanying tuberculids, especially arthritic pains with anemia, seem also to lead to frequent confusion. The morphologic resemblance

of a severe crop of acnitis (tuberculid of the face) to a papular syphilid is undoubtedly great (Fig. 12), and the scars of repeated attacks of erythema induratum with breakdown and ulceration may resemble those of a syphilid more closely than any other dermatologic lesion (Fig. 13). The response of tuberculids to arsphenamin (though they are resistant to mercury), the tonic non-specific effects of the drug in certain tuberculous patients, and its influence on tuberculous eye conditions, still further increase the possibilities of confusion. In therapeutic tests, arsphenamin must not be used. I have seen great social injury and discrimination, even divorce (Fig. 14), to say nothing of needless surgical interventions and medical misinterpretations, result from the deceptive influence of these various possibilities of error.

I would not have you feel that so cursory a review can cover the possibilities and fascinations of the tuberculosis and paratuberculosis of the skin. I have merely touched the surface of the subject in the hope that an occasional diagnostic "coup" which you may score by even a limited familiarity



Fig. 13 (Case A358132). The scarring of a tuberculid on the posterior aspects of the legs. Note the arciform scars with hyperpigmented borders suggesting those of a syphilid. There are, however, many individual scattered varioliform scars.





Fig. 14 (Case A171947). Papulonecrotic tuberculid of the feet and legs with the ulcers of erythema induratum. Note the scars of unnecessary surgical excisions and the resemblance of the normal scarring to that of a syphilid. This patient's husband endeavored to make her response to arsphenamin a cause for divorce on the ground that she had been treated for syphilis. Patients with tuberculids and no evidence of syphilis may occasionally give nonspecific partial positive blood Wassermann reactions.

with this most interesting group of dermatoses, may lead you to look further. I hope it will convince you, too, in the doing of it, that the dermatologist at his best should be not merely a mouther of hard names, with a specialty only half a centimeter deep, but an internist, whose major interest is that re-

markably efficient and highly complex organ or rather group of organs, the skin.

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#### ARGUMENTS AGAINST THE CONTINUANCE OF THE WAR TAX UNDER THE HARRISON NARCOTIC ACT

In protesting against the continuance of taxation under the Harrison Narcotic Act at the rate fixed by the Revenue Act of 1918 as a war measure, three dollars a year, it should be made clear that the medical profession is not protesting against the Harrison Narcotic Act itself, nor against such taxation under it as may be necessary to give the federal government jurisdiction. The Harrison Narcotic Act originally fixed a tax of one dollar a year, which was deemed sufficient to secure federal jurisdiction, and of that tax no complaint was ever made. Any tax in excess of the minimum amount necessary to give federal jurisdiction is essentially an occupation tax on the physician and as such represents a discrimination against the medical pro-

fession, since federal occupation taxes are not imposed on other professions. So far as this tax may be passed on by physicians to their patients, it is a tax on the sick and injured, falling on them because they are sick and injured. The tax collected under the Harrison Narcotic Act is paid into the general revenues of the United States, and does not go directly toward the enforcement of the act. The amount collected under this act from all sources is largely in excess of the amount expended for the enforcement of the act—in 1922, for instance, \$610,311.13 in excess of the amount expended during the same year. In any event, however, there is no reason for imposing on the medical profession any greater part of the cost for enforcing the law than is imposed on any other group in the community, for the law is enacted for the benefit of the community and not for the benefit of the medical profession.

—A. M. A. Jour., Jan. 26, 1924.

## TUBERCULOUS DISEASE OF BONES AND JOINTS.\*

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The better understanding of tuberculous disease of bones and joints has well kept pace with our knowledge of tuberculosis as found elsewhere in the human body. The past decade has brought new aids not only in the pathology, diagnosis, and differential diagnosis, but especially in the wider dissemination of knowledge of treatment. Surgical principles brought forward by the late war have in a great measure in my opinion advanced especially the best conceptions of bone and joint surgical procedures both mechanical and operative.

We are universally agreed that tuberculous disease of a bone or joint is a secondary infection from some other source in the human anatomy, and that the tubercle is carried to the bone and joint structures by the blood stream. Most authorities agree that the tubercle begins its process of destruction only where blood vessels may lead, and may involve bone shaft, epiphysis or cartilage, and only secondarily from breaking down of some of these is the synovia of a joint involved. Pure synovial tuberculosis does not exist, as outside destruction must occur before synovia becomes infected.

The old question as to whether the infection in a bone or joint is of human type or bovine type is still unsettled. From observations of the various reactions in children and adults, I am of the opinion that in my experience children respond more frequently to the bovine reactions while in adults the reverse is true.

The tubercle bacillus when it becomes located in bone or cartilage destroys it, forming a granulation tissue of low vitality, but always with a slight tendency to heal by calcification, encapsulation or cicatrization.

It is well to remember the pathology of healing of a tuberculous focus in bones and joints because the principles of treatment, rest and protection, can only aid the primary tendencies of calcification, encapsulation and cicatrization. Tuberculous disease then in bones and joints is arrested depending

upon the strength of the primary tendencies, and the principles of methods now in vogue in treatment of these conditions are outside aids that tend to strengthen the already pathologic tendency.

Laboratory aids in the diagnosis of tuberculous conditions are many. The roentgen-ray findings are all-important not only as a diagnostic aid in bone and joint disease, but also in detecting evidence of tuberculous disease in other parts of the body, especially the lung and mediastinum. *Von Pirquet* reactions (bovine and human), we commonly find positive in apparently healthy children over four years of age, while children with gross and severe tuberculous lesions often fail to respond. *Manteau* intradermal reactions seem slightly more constant and of more value than the extradermal of *Von Pirquet*. *Wildbolz* autogenous urinary reaction (urine concentrated to one-tenth normal volume and injected intracutaneously) with absent nephritis and staphylococcemia has according to some authors been quite positive in cases of known tuberculosis. *D'Espine* sign in the diagnosis of bronchial gland tuberculosis in our experience has also been positive in a great number of children suffering with joint tuberculosis (again emphasizing secondary infection of bone). *Complement fixation* tests, according to various authors, in children over six years of age compare about the same as adults, about 80 per cent giving fixation reaction.

Tuberculosis seems prone to affect the weight bearing joints. The spine because of its multiple segments seems most frequent, hip and knee follow closely, the ankle and small bones of the foot being more frequently involved than the shoulder, elbow, wrist and digits. The shafts of bones are perhaps involved more frequently than we believed in the past, presenting usually a low grade infection with bone destruction, great proliferation of granulation tissue and sequestra of bone-sand variety.

It is impossible in a short symposium to describe in any detail various areas affected, and only brief general statements may be made. Certain characteristics, however, are noted in tuberculous bone and joint conditions that are well worth notice. Onset of tuberculosis, bone or joint, is an insidious, slow, gradual one, and slight pain gradually progressing is the absolute rule. Muscle spasm is present early, and as a result of muscle

\*Presented in symposium before the annual meeting of the Minnesota State Medical Association, St. Paul, October, 1923.

spasm atrophy comes early and is a constant sign in joint lesions. Slight deformity may be present early, but marked degrees depend somewhat upon the character of the part affected and the progress of destruction in bone, cartilage and surrounding tissue.

The principles of treatment of tuberculous joints are rest and protection and prevention of deformity. These measures are obtained through mechanical apparatus, surgical procedure, good hygiene and heliotherapy.

*Pott's Disease.*—In children absolute rest can be obtained by means of a Bradford gas-pipe frame; marked deformity is rare and deformity is improved when this apparatus is used until definite arrest is obtained. The ankylosing operations of Hibbs and Albee are of value in children over ten years and especially so in high dorsal and lower lumbar locations of the spine. In my opinion, in the future the ankylosing operations are going to be rarely used. Taylor braces, Calot plaster jackets, leather and celluloid corsets, are still used with absolute success in treatment of Pott's disease.

*Hip Joint Disease.*—Prevention of deformity is all-important. In children the Jones abduction splint with extension is extremely satisfactory. Ambulatory apparatus is quite essential in the older cases and is desirable in quiet cases in children. Surgical procedures to aid early ankylosis in the hip joint, especially in adults, are being advised by some authors. Sub-trochanteric osteotomy is universally used to overcome deformity in ankylosed cases.

*Knee Joint Disease.*—Perhaps the dictum of Sorrel can be taken in reference to the knee joint: in children, immobilize; in adults, resect; in the aged, amputate. Of course not every adult case should be resected. Amputation in the aged only shows our inability to stay the disease in the feeble. Deformity can be prevented by suitable apparatus and if present in ankylosed cases can be overcome by osteotomy or resection in many cases.

*Ankle and Foot.*—In the young, immobilization is still important. Arthrodesis or removal of bone affected, rarely in children and often in adults and the aged, may hasten the process of arrest.

*Upper Extremities.*—Not being weight bearing joints, surgical procedures are more frequently advised. In children, corrective apparatus and appliances should be given full trial before surgical

intervention is advised even when the disease is isolated to one small bone or joint.

*Time Element.*—The process of healing in tuberculous disease, like the onset, is slow and insidious. It requires six to eight months for the smallest bone or joint, and four to five years in the large bones or joints, even when uncomplicated. The rule of wearing supporting apparatus from six months to a year after all signs and symptoms have disappeared, is necessary and essential to procure arrest.

*The Complications.*—Deformities of various joints should be corrected and the parts placed in position to give the best function. Pott's paraplegia demands absolute rest and fixation preferably upon the Bradford frame. Paraplegia in children is not unfavorable because the granuloma about the cord usually absorbs with almost universal recovery. Paraplegia in adults is much more serious because the spinal cord in adults is usually surrounded by an abscess with an infiltration of white cells into the cord, and white degeneration of the cord occurs with permanent destruction and consequent paraplegia. Laminectomy in my experience has failed to relieve paraplegia, and fortunately is rarely used. Abscesses are not to be tampered with unless they become large and when uncomfortable because of size. In large cold abscesses aspiration is the rule, always endeavoring to keep the abscess closed. If an abscess should become secondarily infected it should be drained as any acute abscess. Pastes and antiseptic solutions in our experience are not to be compared with heliotherapy by sun and quartz lamps. Sinuses should be kept clean and secondary infection avoided as long as possible. Heliotherapy is our most valued agent in treatment of sinuses. Amyloid degeneration, the result of long continued suppuration, is a dangerous condition, but not necessarily fatal especially if suppuration can be stopped. In Minnesota we have seen after a summer's treatment with heliotherapy sinuses close and amyloid conditions disappear. Meningitis is a calamity which may be associated with tuberculosis at any time.

*Differential Diagnosis.*—In the differential diagnosis, tuberculosis should be confused only with pathological conditions that are slow in onset and very gradual in progress: chronic bone and joint lesions non-suppurative of the rheumatic type, chronic hypertrophic and atrophic; lues of bone or

joint; new growths; Von Perthes-Legg disease of the hip joint; bone abscess; chronic sprains; typhoid joints; joint abscess. The diagnosis of a tuberculous bone or joint condition is essentially the diagnosis of a chronic condition. A careful history, with intelligent interpretation of a roentgen-ray plate is of the greatest value. Laboratory aids, while of great value in the differential diagnosis, fail to be as convincing to me as the gradual insidious onset and characteristic bone atrophy, deformity and calcareous change seen in the usual radiogram of a tuberculous bone or joint. The positive diagnoses made in the laboratory are with the microscopical section and guinea pig peritoneal tests.

Heliotherapy can be used with considerable success even in Minnesota. The sun's rays beginning with two minutes' exposure in April is increased until the entire nude body is exposed to at least one hour's noon sun in mid-summer and fall; the quartz lamp is used in winter and on cloudy days. Apparatus should be used so the affected joint as well as the rest of the body can be exposed, sinuses and abscesses to receive close direct rays of the quartz lamp beginning with one-half minute exposure and the time lengthened to fifteen or twenty minutes or until signs of irritation appear. Heliotherapy is a most valuable adjunct in the hygienic treatment of tuberculosis. Good hygiene is essential. Sanitarium treatment is far superior to results obtained at home. Tuberculin in bone and joint cases is rarely used.

The old idea that an arrested tuberculous joint is a firmly ankylosed one is being superseded by a new idea that a tuberculous joint may be arrested without the disability of ankylosis. I believe this idea is coincident only with the much earlier diagnosis, earlier mechanical treatment and better hygienic and therapeutic measures now in vogue.

In conclusion we should remember the principle of treatment: rest, protection and good hygiene; treatment in children and young adults; resection of bones and joints of upper extremities in adults where a time element must be considered; fixation operations upon the spine only as an aid to outside immobilization and then after the age of seven and as operation of election; ever remembering that a tuberculous disease is cured by arrest and that the strength of arrest is coincident with the amount of calcification, encapsulation or cicatrization.

## TUBERCULOSIS OF THE GENITO-URINARY TRACT\*

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If it is recalled that tuberculosis of the genito-urinary tract embraces pathologic changes in eight complicated structures, many of which are bilateral, it will be realized how brief must be the reference here to even the most important of these changes.

### INCIDENCE

The disease is most common between the ages of twenty and forty, but in any large series of cases approximately one-fourth of the patients will be more than forty. The incidence is twice as great in males as in females.



Fig. 1 (Case A158792). Areas of tuberculous calcification in an early case of renal tuberculosis.

### SYMPTOMS

The usual symptoms of cystitis, frequency, dysuria and hematuria should always arouse a suspicion of tuberculosis. If these symptoms occur in early adult life, and do not readily respond to systematic treatment, the probability of tuberculous origin is greater.

In all cases of chronic cystitis a thorough urologic examination should be made, including the

\*Read in symposium before the fifty-fifth meeting of the Minnesota State Medical Association, St. Paul, October 10-12, 1923.





Fig. 2 (Case A422611). Areas of tuberculous calcification simulating renal calculi.

examination of the urinary sediment for the bacilli of tuberculosis. Why urinary sediments are not thus examined as frequently as sputum is hard to understand; the technic is similar, and the opportunity to make an early, exact diagnosis is equal. It is true that care must be taken not to confuse the smegma bacillus, which is also acid-fast, with the tuberculosis bacillus, but if care has been taken in obtaining the specimen of urine, such contamination will seldom occur.

Authorities now believe that genito-urinary tuberculosis is secondary to other foci. Therefore, if the bacilli are not found in the urine, evidence of tuberculosis in the skin, lungs, glands, or bone should be sought and, if found, considered as added evidence. If the result is negative, the genital tract should next be examined because it will be found involved in 70 per cent of patients with urinary tuberculosis. There is no uniformity of belief as to which of the genital organs is usually invaded first, but clinical findings indicate that the disease will be found in the majority of cases in all structures. Such general involvement results because the pathologic changes produce little or no pain, and an epididymis that has gradually become swollen and nodular does not often attract medical investigation until a discharging sinus has resulted. When the disease has reached this point, it is usual to find the prostate nodular, with multiple tubercles, and one or both seminal vesicles thickened and enlarged.

#### TREATMENT

There is considerable diversity of opinion as to the form of treatment which should be employed. Young and others advise removal of the entire seminal tract, including epididymis, vas, prostate and vesicles, basing this advice on the fact that in approximately 50 per cent of cases, the disease becomes bilateral if allowed to progress, and on the theory that it originates in the seminal vesicles and spreads to the prostate and epididymis. Others find that the removal of the epididymis will be followed by quiescence of the infection in the vesicles and prostate. This has been our experience at Rochester. If it does spread to the opposite epididymis, its later removal is not difficult, and in many cases will not be necessary. Care should be taken not to operate too soon after the onset of tuberculosis in the genital tract, for there is a greater chance that miliary or meningeal tuberculosis will result if operation is performed while the infection is sub-acute.

#### DIAGNOSIS AND SYMPTOMS

If a thickened epididymis, with or without a sinus, has been discovered in a patient with intractable cystitis, the diagnosis of urinary tuberculosis is highly probable. If the epididymes appear normal, a rectal examination may show an early stage of the disease in the shape of a nodular prostate or inflamed seminal vesicle. If the genital tract gives no clue, a careful roentgen-ray examina-

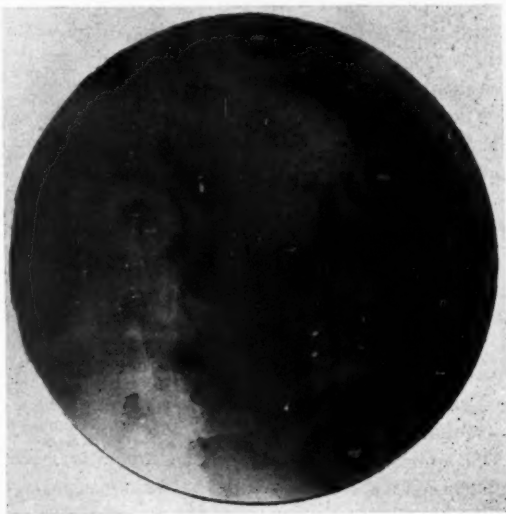


Fig. 3 (Case A312890). Area of tuberculous calcification in an advanced case of renal tuberculosis.

tion of the renal areas may be as instructive as that of the chest. Braasch and others have pointed out that, in 20 per cent of cases, the tuberculous areas in the kidneys early become the site of lime deposit, and multiple small shadows resembling those that would be cast by particles of sand give evidence of renal involvement. As the disease advances, the areas of calcification become larger, and may make the distinction between tuberculosis and stone formation difficult. However, the areas of calcification resulting from tuberculosis have a more irregular outline, and their density varies throughout, while that of a renal calculus is apt to be uniform. Still later in the disease, the greater portion of the kidney may become calcified, but at this stage the diagnosis is usually apparent.

In the female patient, a vaginal examination often yields as helpful corroborating data in a doubtful case as does rectal examination in the male, for during the course of the disease the ureter from a tuberculous kidney quickly becomes much thickened and tortuous, and can be readily palpated through the vagina. Such a finding not only helps to confirm the diagnosis of tuberculosis, but indicates on which side it exists.

Urinary tuberculosis probably always commences as a unilateral disease, and although the first symptoms arise from the bladder, the initial site is usually in the renal parenchyma, which is infected in the majority of cases through the blood stream. The areas of infection usually appear in the cortex, are at first few in number and possibly single. They occur most often at either pole of the kidney, are at first distinct, separated by healthy parenchyma, but as the disease progresses, coalesce. As the tubercle enlarges, more of the parenchyma becomes involved, and a considerable area of caseation results. When the process reaches the pelvis or calyx, it breaks through and destroys the normal contour of the walls, producing the characteristic irregular moth-eaten appearance in the pyelogram. So characteristic of tuberculosis is this deformity, that any pyelogram which shows either the upper or lower calices irregularly filled, with a tendency for the pyelographic medium to exude into the cortex, should at once call to mind the possibility of tuberculosis.

If, added to these findings, the ureter is much dilated and tortuous, the evidence is much stronger. If pyelonephritis can be excluded, the diagnosis is unusually certain. In pyelonephritis, the irregu-

larity of outline in the calices is not so sharp, and occurs throughout the pelvis and calices instead of being confined to a single area. Also, pyelonephritis is generally bilateral, while a tuberculous infection remains unilateral for a long period. However, it is seldom necessary to resort to pyelography to establish a diagnosis of tuberculosis, as other cystoscopic findings are so characteristic, chief among these being cystitis. This has an entirely different appearance at different stages of the disease, but at every stage it is usually quite characteristic. If the involvement of the bladder is of recent occurrence, the inflammation is usually localized on the same side as the involved kidney, its greatest severity being found in the proximity of the ureteral orifice. In such early cases multiple small tubercles, resembling small pearls, are scat-



Fig. 4 (Case A307536). Pyelogram of a tuberculous kidney showing cortical destruction, dilatation and tortuosity of the ureter.

tered over the inflamed area. They may appear singly or in groups, and immediately surrounding them, the mucosa has a redness of the greatest intensity. As the disease progresses, these tubercles break down and, by coalescing, form multiple shallow ulcers throughout the inflamed area, which are characterized by a small slough that usually floats freely from them, and by the intensity of the surrounding inflammation. The density of the color immediately surrounding the shallow ulcers is seldom seen in any other form of cystitis. On distention of the bladder, the affected areas bleed

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easily, and the greatest pain is produced by even slight distention. Such an area of ulceration and injection may be localized to a single area, but it is usually not long until the entire viscus becomes

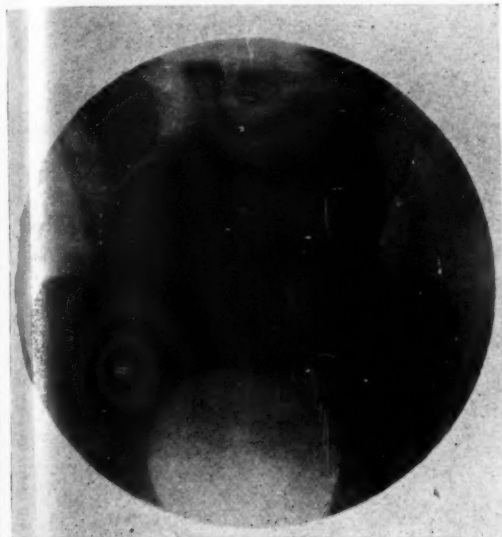


Fig. 5 (Case A303068). Cystogram of a tuberculous bladder showing reflux up the ureter.

involved. After long periods of such involvement the walls of the bladder become so cicatrized that they lose all power of contractibility, and the bladder is converted into a tissue incapable of its normal contraction, and holding but a few ounces of urine. The cicatrization at times becomes so extensive as to involve the urethral sphincter and produce permanent incontinence; in the female this usually occurs late in the disease, while in the male the same process develops multiple soft strictures, which are encountered when an attempt is made to pass a sound or a cystoscope.

In a goodly number of cases, however, the ulcerations in the ureter, early in the disease, result in stricture that occludes the lumen entirely. This produces what has become known as auto-nephrectomy and probably includes the only cases of renal tuberculosis in which the patients recover, except by surgical treatment. If this occlusion of the ureter occurs early in the disease, a history is often elicited of more or less severe cystitis at some time in the past, from which the patient has recovered. In such cases cystoscopic findings will reveal a stricture of one ureter, which at first gives the impression of being due to a calculus, but since a

shadow cannot be detected in the roentgen ray, the axiom is remembered that "a stricture of the ureter that should be due to stone, but is not, should be due to tuberculosis." In such a case the opposite kidney will be found to hyperfunctionate, the spurts of urine appearing very frequently, and if a test of renal function is made by means of phenolsulphonphthalein, 20 or 25 per cent may be recovered in fifteen minutes instead of the usual 15 per cent.

The removal of tuberculous kidneys, when encysted, might not be indicated, were one certain that they would remain encysted, but the danger of an extension of the disease through the capsule to form a perinephritic abscess, and the possibility of its acting as a focus from which the remaining kidney may become involved, demands its removal except in patients well past middle life.

Once a diagnosis of renal tuberculosis is made and the adequacy of the opposite kidney established, nephrectomy is indicated, for unless this is performed, the disease in time will become bilateral. It is imperative that nephrectomy be performed early, in order to give the bladder an opportunity to heal before too extensive ulceration develops. Before surgery is undertaken, however, it is wise to warn the patient that the removal of



Fig. 6 (Case A192791). Typical areas of tuberculous calcification in a fairly advanced case of renal tuberculosis.

the diseased kidney will not at once remove the symptoms from which he sought relief; that the cystitis will be slow in healing, and that the max-

imal improvement cannot be expected in less than two years. If improvement is not deemed sufficiently rapid, good results are often obtained by

ing kidney, which it was impossible to detect at the time of operation. Braasch, in a previous review, found the mortality for the first five years to be 20

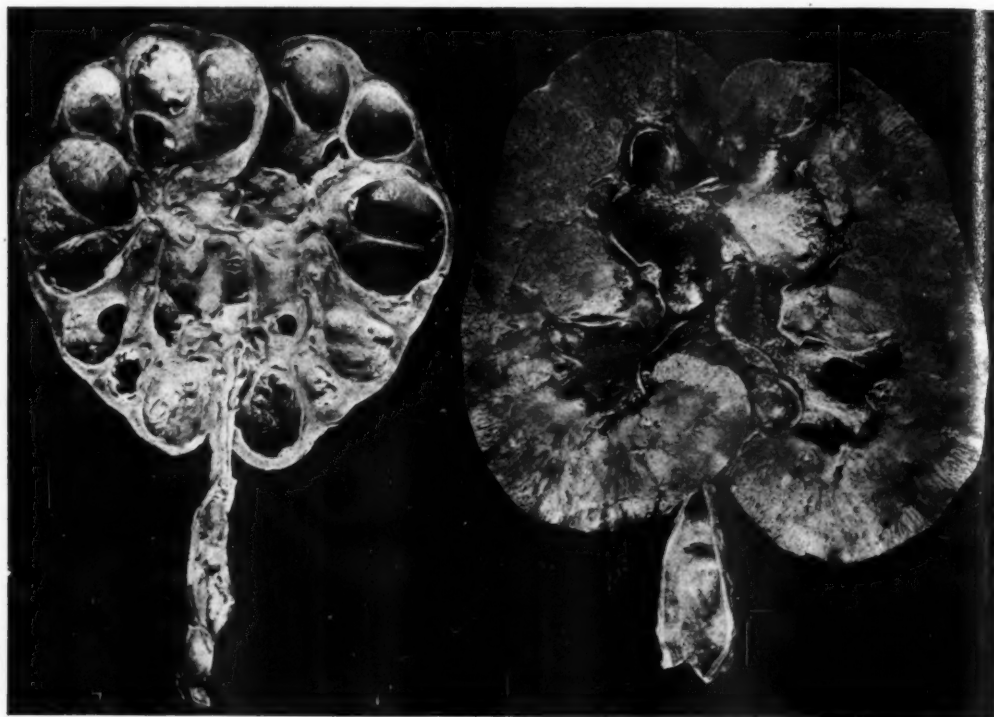


Fig. 7 (Case A419323). Kidneys from a patient with bilateral renal tuberculosis. Note compensatory hypertrophy of the less involved kidney and characteristic cortical destruction of the other.

the lavage of the bladder with increasing strengths of phenol solution up to 6 per cent.

The risk of surgical treatment is not greater than that of general surgery. Sixteen deaths resulted from 678 nephrectomies for tuberculosis performed at the Mayo Clinic between 1894 and 1923, inclusive, a mortality of 2.3 per cent. Braasch and Scholl, in a recent investigation of the late mortality in cases of nephrectomy, found that more than half the deaths (13 per cent) occur during the first year, probably owing to disease in the remain-

per cent. The prognosis for recovery would, therefore, be 80 per cent, surely a gratifying result in so serious a disease.

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## GASTRO-INTESTINAL MANIFESTATIONS OF TUBERCULOSIS\*

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In our conception of tuberculosis we keep in mind the fact that any manifestation of this disease in any tissue of the body other than the lung is, in the vast majority of cases in adults, coexistent with demonstrable pulmonary involvement or secondary to it. However, we may properly discuss gastro-intestinal manifestations in a symposium on non-pulmonary disease because:

1. In a certain percentage of these cases, either the pulmonary lesion is negligible as being inactive or is not clinically demonstrable.

2. Recent developments in diagnostic methods and in treatment have focussed attention upon these complications.

In the inception of tuberculous disease, when the bacilli and their products are beginning the contest with the natural resistant forces of the body, these forces are of the protective type and are reinforced more by the weapons of medicine than of surgery; but later on, as the natural defences fail, surgical intervention may come in and by physical and mechanical means remove those tissues that have been beaten in the contest and whose existence may be a menace to other vital parts. Thus has surgery for many years been winning the battle, especially in the chronic hyperplastic types of tuberculous enterocolitis.

During the past ten or twelve years, however, because of the development of roentgen examination and an improved treatment, there has been dawning a new era in our conception of the seriousness of tuberculosis of the gastro-intestinal tract. We now contemplate these conditions in a much more hopeful and courageous frame of mind than formerly obtained.

**Incidence.**—Some observers have found intestinal tuberculosis to be primary in from 3 to 5 per cent of all cases in adults; while in children it is primary in from 30 to 50 per cent and in the latter group the infection is usually of bovine origin. Lemon,<sup>7</sup> in a recent presentation of fifty cases of tuberculous enterocolitis, finds in 14 per cent no primary focus in the lungs. He suggests that this

high percentage of primary intestinal disease in adults may be due to the fact that these patients come from a country where examination of animals for tuberculosis is a practice of recent development. It is generally considered, however, that even when the intestinal manifestation is the dominating feature, it is secondary to a tuberculous lesion elsewhere, in lung or gland tissues.

Tuberculous lesions of the mouth, pharynx and esophagus are very rare and seldom if ever primary. Actual tuberculous lesions of the stomach are also extremely rare, ulceration, the most common form, occurring but twice in 2,000 autopsies reported by Fenwick. The gastric lesions are found as miliary nodules or as single or multiple ulcers.

Tuberculous ulceration of the intestines has been found by ordinary methods of diagnosis to be exceedingly rare in early pulmonary disease. Schwatt and Steinbach<sup>11</sup> found, in 2,000 early pulmonary cases, a diagnosis of tuberculous enterocolitis was made clinically in only sixteen cases, or .8 per cent. In 135 advanced cases the diagnosis was made in thirteen cases, or almost 10 per cent. In 117 cases coming to autopsy they found forty cases, or 30 per cent. Other observers find 60 to 90 per cent of all pulmonary cases coming to autopsy showing intestinal lesions. Brown and Sampson,<sup>3</sup> by roentgenological examination of the intestinal tract in pulmonary tuberculosis, give a much higher percentage of intestinal involvement than is diagnosed by ordinary clinical means.

**Location of Lesions.**—The lower portion of the ileum, the cecum and the appendix are most frequently involved, disease occurring here in about 85 per cent of all cases of intestinal tuberculosis (Conrath). However, tuberculous appendicitis exists as a disease peculiar and distinctive in itself in a small percentage of cases. It has been estimated that from 1 to 2 per cent of all appendices at operation are tuberculous. Margaret Warwick<sup>14</sup> found at the University of Minnesota in post-operative examination of 210 appendices, approximately 1 per cent tuberculous. She emphasizes the wisdom of sectioning and examining carefully all appendices on removal, as demonstration of the tuberculous nature of the disease in the removed tissue may point the way to an early diagnosis of tuberculosis elsewhere in the body, with consequent early treatment.

**Classification.**—Tuberculosis of the intestines is conveniently classified in four groups:

\*Presented in symposium before the annual meeting of the Minnesota State Medical Association, St. Paul, October 10, 1923.

1. Chronic hyperplastic tuberculosis which constitutes about 85 per cent of all intestinal tuberculosis in adults. It may be found in the terminal ileum, the flexures of the colon and in the rectum, but most commonly occurs in the cecum.

2. The ulcerative type, the common tuberculous enteritis occurring in children and as a secondary lesion in adults with advanced pulmonary disease.

3. The stenotic or cicatricial type which occurs usually in the small intestine.

4. The entero-peritoneal type which favors the ileo-cecal region, involving adjacent lymph nodes and peritoneum. In this form there is ulceration as well as hyperplasia of the bowel wall.

*Symptoms and Diagnosis.*—Disturbance of the gastro-intestinal function is very common in pulmonary tuberculosis. The question of diagnosis of intestinal involvement must be decided upon a general survey of the whole history and symptoms, more than upon one particular feature. Failing appetite, constipation, flatulence, feeling of discomfort in the stomach after eating are commonly present in patients who are developing intestinal disease. The leading symptom suggesting intestinal involvement is pain felt in the mid or lower abdomen, intermittent in character, suggesting gas pains, aggravated by food, relieved by fasting and persisting from day to day. Diarrhea may be persistent or may alternate with constipation. Pottinger<sup>9</sup> mentions, as a suspicious symptom, the occurrence of stools only at night, due to changes in motility. The presence of diarrhea may be misleading, due to errors in diet causing intestinal catarrh. The finding of bacilli in the stools is of no diagnostic value, except in the absence of open pulmonary lesions. Whether a study of the symptomatology will determine what part of the bowel is affected and to what extent, there is some doubt.

In his series of 50 cases Lemon did not find that the symptoms indicated the location or extent of the lesions. Archibald,<sup>1</sup> by combining symptoms with findings by palpation, was able to formulate the following scheme of diagnosis:

"1. When the small bowel alone is involved, there is present constipation, often quite marked, and there is no thickening or mass, and in particular no tenderness to palpation localized in the cecal region.

"2. When the cecum, with or without the ascending colon, is involved, and the small bowel is free, there is present diarrhea or alternating constipa-

tion and diarrhea, and there is always to be felt a fairly defined thickening, sometimes even a mass, and there is a tenderness to palpation in the cecal region.

"3. When both small bowel and cecum are involved there is a mixture of the above signs and symptoms.

"4. When the transverse and descending colons are diseased in addition there are very rarely any signs that point to it; these are comparatively silent regions.

"5. When the appendix alone is tuberculous, it is not possible before operation to exclude the possibility of disease of the cecum. Between simple appendicitis and tuberculous disease it is often difficult to make a diagnosis; but it may be said that, where definite thickening of the tissues in the appendix region is felt, without there being an acute inflammatory reaction, and with a history of chronic slight pain and of occasional subacute attacks with persisting soreness, then the condition is much more suspicious of tuberculosis of the appendix, and possibly also of the cecum, than of simple appendicitis."

The roentgen diagnosis of ileo-cecal tuberculosis was first brought to notice by Stierlin<sup>13</sup> in 1911. He stated that "the early as well as the later stages of the so-called cecal tuberculosis, can be diagnosed by this means, even in cases undiagnosable by the ordinary clinical methods." Other observers, notably Case,<sup>9</sup> Pirie,<sup>8</sup> Brown and Sampson,<sup>3</sup> and Carman,<sup>5</sup> verify this statement and present statistical evidence to show the inestimable value of a roentgen examination of the intestinal tract in all cases of pulmonary tuberculosis. Brown, Sampson and Hayes<sup>4</sup> in 1922 report the results of their study based on 1,036 cases. "Hypermotility, localized or general, and filling defects were not the most significant findings," and they conclude that these data "indicate only ulceration of the colon which, when it occurs in a patient with pulmonary tuberculosis, is practically always tuberculous in nature. Persistent and recurring segmentation and dilation of certain loops of the small bowel are very suggestive of a similar lesion in this location."

With the aid of these roentgenological studies in diagnosis, treatment of these complications with or without surgical intervention, may be employed much earlier in the disease and with consequent happier results than formerly were obtained.

*Treatment.*—Tuberculous ulceration of the intes-

time in the early stage is generally considered to be the problem of the physician. Healing may occur under the ordinary hygienic dietetic treatment in the sanatorium. While the chronic hyperplastic type offers greatest relief by surgical means, in the ulcerative variety, when it has failed to improve after a reasonable length of time under proper care and medication, and the pulmonary process is not so active as to contraindicate surgical procedure, great relief of symptoms may follow operation and permanent results are obtained in an encouraging number. Surgery is emphatically indicated when there are palpable masses in the ileocecal region associated with signs of chronic intestinal obstruction or when ulceration has gone on to cicatrization with stenosis of the intestinal lumen.

Surgeons report varying results depending obviously upon the extent and activity of the pulmonary disease and the location and extent of the intestinal complication. In Archibald's series of thirty-four cases of all types, the great relief from distressing symptoms in patients who would otherwise continue to suffer and the percentage of permanent results would encourage us to look upon this procedure with favor.

Ringer and Minor<sup>10</sup> report thirty cases of intestinal tuberculosis treated by intravenous injections of calcium chloride with marked relief of symptoms in some cases. The authors believe this treatment prolongs life in some individuals and even may possibly cure the intestinal disease if diagnosis is made early. Other observers have noted similar results. Heliotherapy is of undoubted value in the treatment of intestinal tuberculosis. Dr. Bendes, of wide experience in the employment of this method of treatment, will discuss this therapy. However, at the risk of repetition I wish to emphasize the efficacy of artificial sunlight (the quartz lamp) in the treatment of these cases. In 1921 Blanchet<sup>2</sup> of Saranac reported twenty-five cases in which intestinal disease was diagnosed clinically and intestinal irritability demonstrated by the roentgen ray. Of these twenty-five cases, 40 per cent lost all symptoms and showed negative pictures with the roentgen ray after treatment. Stewart<sup>12</sup> reports seventy-seven cases treated by the quartz lamp, with improvement in 66 per cent. The experience of other clinicians is varied. The writer has used the ultra-violet ray in a considerable number of cases with encouraging results.

Although we cannot frequently check up our diagnoses by post-mortem examination—which fact is perhaps the best evidence of the efficacy of the treatment—the present-day clinical and roentgenological methods of diagnosis are sufficiently accurate upon which to base the claim of beneficial results obtained by this therapy.

#### CONCLUSION

1. Intestinal tuberculosis may occur in the absence of a demonstrable pulmonary lesion, but is usually a complication of disease in the lung.
2. Healing may take place under medical treatment.
3. Roentgenological examination of the gastrointestinal tract should be made in all cases of pulmonary tuberculosis.
4. Surgical intervention greatly relieves distressing symptoms and may produce permanent results.
5. A careful examination of all appendices removed by operation would reveal tuberculosis in at least one per cent of all cases. Any means of diagnosing this disease should not be overlooked.
6. Improved diagnostic methods and favorable results from treatment by natural sunlight and quartz lamp therapy greatly augment our hope and courage in the treatment of this serious condition.

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## HELIO THERAPY IN THE TREATMENT OF TUBERCULOSIS\*

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Heliotherapy is that branch of medical science which treats of the application of the sun as a remedy in the treatment of disease. Locally its application is characterized at first by a feeling of warmth, then a slight erythema, followed by a chronic congestion and finally a pigmentation.

The idea of modern heliotherapy was conceived by Rollier. In 1903, he opened a clinic in Switzerland and formulated a technique, which has stood the test for twenty years. There have been as many deviations and improvements in his technique as there are heliotherapy workers in Europe and America. Every man who starts a clinic for heliotherapy thinks he should improve on Rollier's technique and have a little private one of his own. Rollier's technique has been used for twenty years and after following it almost ten years, I, personally, cannot see why one should deviate from it. In fact, it should be adhered to more closely. Heliotherapy does not mean turning a patient out into the sun indiscriminately; it means giving carefully supervised sun baths.

The great obstacle in treating extra or non-pulmonary tuberculosis is that this type of tuberculosis is looked upon as a local disease, and is referred to the surgeon or orthopedist, and the fact that it is a general constitutional disease with local manifestations is entirely ignored.

The technique of heliotherapy is as follows:

Rollier started out by zoning the body, as feet, legs, thighs, abdomen and chest, giving each zone its therapeutic dose of sun.

On the first day, insolate (expose to the sun) the front of the feet as far as the ankles for five minutes; at the end of five minutes, roll over and expose the back part of the feet the same way for five minutes. Then cover up and rest one hour. At the end of one hour, repeat the insolation and at the end of this second exposure, the sun bath is finished for the morning of the first day. That afternoon, repeat the insolation the same way as in the morning.

\*Presented in symposium at the annual meeting of the Minnesota State Medical Association, St. Paul, October, 1923.

On the second day, expose the anterior part of the feet as far as the ankles for five minutes. At the end of five minutes, carry the exposure up on the legs as far as the knees for another five minutes. At the end of ten minutes, roll over and insolate the back part of the feet and legs in the like manner. Two exposures in the morning and two exposures in the afternoon at one hour intervals.

On the third day, insolate the anterior part of the feet for five minutes. At the end of five minutes, carry the insolation up on the legs as far as the knees for another five minutes and at the end of ten minutes carry the insolation up on the thighs for five minutes. At the end of fifteen minutes, roll over and insolate the back part of the body in a like manner. Give two insolutions in the morning and two insolutions in the afternoon at one hour intervals.

On the fourth day, insolate the anterior part of the feet for five minutes; at the end of five minutes, carry the insolation up on the legs for five minutes. At the end of ten minutes, carry the insolation up on the thighs for five minutes; at the end of fifteen minutes, carry the insolation up on the abdomen. At the end of twenty minutes, roll over and insolate the back part of the body in a like manner. Do this insolation twice, once in the morning and repeat the insolation in the afternoon.

On the fifth day, insolate the anterior part of the feet for five minutes; at the end of five minutes, carry the insolation up on the legs for five minutes; at the end of ten minutes, carry the insolation up on the thighs for five minutes; at the end of fifteen minutes, carry the insolation up on the abdomen for five minutes; at the end of twenty minutes, carry the insolation up on the chest for five minutes; at the end of twenty-five minutes, roll over and expose the back part of the body in a like manner. This insolation is carried out once in the morning and once in the afternoon.

On the sixth day, repeat all the insolutions as on the previous days, but increase the chest insolation to ten minutes both front and back.

On the seventh day, do all the previous insolutions, but give the chest fifteen minutes both front and back.

Each day, increase the insolation by successive five minute steps until the fourteenth day.

On the fourteenth day expose the whole body for fifty minutes; on the fifteenth day for fifty-five minutes; on the sixteenth day for sixty minutes;



on the seventeenth day for sixty-five minutes; on the eighteenth day for seventy minutes; on the nineteenth day for seventy-five minutes; on the twentieth day for eighty minutes; on the twenty-first day for eighty-five minutes; on the twenty-second day for ninety minutes.

Now, though we find that by this graduation we are able to give three hours of sun at one time, and in some cases even four and five hours, still we do not advocate giving that in all cases, but only in cases where the tolerance is found to be great enough. After a pigmentation has taken place, large doses of sun can be given without deleterious effects.

The usual treatment is three hours of sun at one and one-half hour periods, especially, in high typed blonds, red-haired persons, the emaciated, the children and the aged.

*On the fourteenth day, total exposure.* The treatment is divided into two periods of ninety minutes each, forty-five minutes on the back and forty-five minutes on the anterior part of the body. Two such treatments are carried out daily, one treatment in the morning and one treatment in the afternoon. When the patient is able to withstand this amount of sun without any unpleasant effects and when his general condition starts to improve, more sun can be given up to four and five hours.

Some patients react more favorably to frequent short exposures instead of too long exposures, especially those who are inclined to burn. In the latter cases, the pigmentation will take place more rapidly, if four one-hour exposures are indulged in instead of two two-hour exposures.

An ice cap to the nape of the neck and a cold compress over the heart alleviates symptoms in cases who become fatigued easily and who suffer from exhaustion and palpitation.

The technique used at Glen Lake Sanatorium is the same as the one followed by Rollier, with this exception: Dr. Rollier allows his patients to rest for a period of from fifteen to twenty minutes between exposures, but we have found that in most cases this is too short a time. If the patients have not had sufficient rest they become exhausted. Twenty minutes of rest between exposures should be the minimum time. A longer period is much better. When a patient starts routine sun cure we have him rest for an hour between exposures. He should not be tired after a treatment, but should feel invigorated. If patients are tired after a sun

bath, they have been exposed too long a period or they are not reacting favorably to the treatment.

Some of the accidents of faulty technique are: headache, nausea, vomiting and fatigue. Here I might mention that the sun rays will cause fatigue just as voluntary exercise does, if indulged in indiscriminately. The safest method is graduating the patients as we do.

Different individuals react differently to the sun. All patients cannot abide strictly by the routine treatment as it is prescribed by the physician. The susceptibility of the individual must be taken into

Days	Feet	Legs	Thighs	Chest	Abdomen
1	5				
2	10	5			
3	15	10	5		
4	20	15	10	5	
5	25	20	15	10	5
6	30	25	20	15	10
7	35	30	25	20	15
8	40	35	30	25	20
9	45	40	35	30	25
10	50	45	40	35	30
11	55	50	45	40	35
12	60	55	50	45	40
13	65	60	55	50	45
14	70	65	60	55	50
15	Total	.....	.....	.....	55
16	Total	.....	.....	.....	60
17	Total	.....	.....	.....	65
18	Total	.....	.....	.....	70
19	Total	.....	.....	.....	75
20	Total	.....	.....	.....	80
21	Total	.....	.....	.....	85
22	Total	.....	.....	.....	90

consideration. Some patients can stand a faster graduation than the one prescribed, but there are others who cannot tolerate it, especially the blonds, the red haired, the emaciated and the febrile cases of pulmonary tuberculosis. In these cases, the progress is even slower. We generally start them on periods of exposure of two minutes on each zone, but we have had cases where even two minutes of exposure has proven too much.

The exceptional cases, as mentioned before, should be watched constantly so that they do not

burn. At the first sign of redness the patient should be covered and taken out of the sun. In case a burn follows, it is accompanied by a sense of burning, itching and smarting, and in some cases the patient will run a high temperature and pulse. Generally this condition lasts for about three or four days and then disappears. The patient is then kept out of the sun until all signs of a burn have disappeared and his temperature and pulse have returned to what it was before the accident occurred. A temperature resulting from a burn is contra-indicated for sun cure. When the patient is again started on his treatments, he should be started a few steps back from the time when sun baths were discontinued. As I said before, these cases should be watched constantly so that they will not burn, because if they do, the progress of the treatment is interrupted and much valuable time is lost.

When Rollier instituted heliotherapy it was for the purpose of curing surgical tuberculosis. Since then it has been used and advocated as an adjunct in the treatment of metabolic disease and some individuals even go so far as to prescribe heliotherapy when they have exhausted all other ethical, medical and surgical skill at their command.

After cases of surgical tuberculosis have passed through the operative and plaster paris stage and find their way into the Sanatorium, they usually have a pulmonary lesion complicating the surgical one and also in many cases there are abscess formations and draining sinuses due to secondary infection.

It is because of these cases of surgical tuberculosis complicated by pulmonary tuberculosis in all stages of the disease including some with cavity formation that we are varying just this much from Rollier's technique.

We take temperature and pulse because those two factors are the "stop, look and listen" sign post of activity and also of excessive sun. This is done as follows:

Temperature and pulse are taken immediately after the sun baths and again one-half hour after the sun bath, while the patient is resting. If there is one degree elevation in temperature or a marked increase in pulse rate after the half hour rest, it means that the patient is getting too much sun and the treatment is dropped back a step or two to the point where the patient reacted favorably. The procedure is carried out as long as a patient is on

sun. We know that this is important and the observation should begin as soon as the patient starts sun cure.

If a patient gets a headache, becomes dizzy or becomes nauseated while taking sun, the sun bath should be discontinued immediately and the patient kept in his room or in the shade until he has been relieved. If he remains in the sun in spite of these symptoms, there will be a gastro-intestinal disturbance lasting from a few days to even possibly a week.

The initial sun bath is not taken until the patient has become acclimatized. Generally this takes about two weeks. During this time the patient is studied, the range of temperature and pulse is watched, the heart and lung condition is studied, blood and urine conditions noted. Wassermann and other tests are made. During this time, the patient becomes accustomed to the light and air, and has also learned through observations and instructions some idea of how the treatment is carried out and what is expected of him.

Before a patient starts his daily treatment he takes his temperature and pulse. Immediately after the sun bath he again takes his temperature and pulse, and then again, one-half hour later. So if an acute condition occurs we can tell just which sun exposure was the cause.

One of the principal factors to be taken into consideration in giving heliotherapy is the source of the sun. Early morning sun is desirable and it is best to avoid the hottest time of the day and the direct rays of the sun. White linen should be used as a covering on the bed because it intensifies the sun's rays.

Certain precautions should be taken while the patient is taking the sun bath. The head, especially the nape of the neck, should be protected from the sun's rays. This can be done by means of an awning, a wide-brimmed hat, or a sunbonnet. These precautions should be carried out except in special cases when the patient is instructed to expose his face to the sun. Even then, when exposing posteriorly, he should cover the nape of his neck. We have made several attempts to dispense with the ice cap or wet cloth at the nape of the neck and over the heart. This can be done in the majority of cases but there are some cases where it is still absolutely necessary.

The patients should always wear dark glasses, black being the best. If they do not they may con-

tract conjunctivitis. They should also be protected from the wind at all times.

When starting the sun baths it is necessary to go slowly. The time is gradually increased until a pigmentation has been obtained resulting in a mahogany brown. Then the exposures can proceed more rapidly and longer periods to the sun can be given, even as much as four or five hours at a time.

The reason for this method is described by Rollier as "By this means we are able to get a general idea of the tolerance of the patient to sunlight before the more vulnerable parts of the body are exposed; any accidents which result are therefore of a slight nature, and as they only affect outlying regions of the body, their general effects are likely to be minimal. The thoracic and abdominal viscera are not subjected to any congestion but rather to a decongestive action, as insolation of the extremities causes the blood to flow to these regions and therefore away from the viscera."

In the various locations of the disease, orthopedic position is maintained by means of pillows, boards and extension apparatus. No casts are used.

During the course of pigmentation various things happen. All patients do not respond in the same manner. The sequences of occurrences that take place are numerous.

I will endeavor to explain to you just what takes place when a patient is first exposed to the sun. I will begin with the action of the sun upon the skin, and then follow with the action of the sun upon the individual.

The action of the sunlight upon the skin is in proportion to the length of time and the intensity of the light. At first, there is a dilatation of the superficial capillaries in the skin. This produces an erythema which gradually shades into a bronze hue, then turns to a copper color and finally turns into a chocolate brown.

During the first five or seven days of treatment the first noticeable perception is a branny desquamation of the skin, which brushes off like dandruff. This desquamation is nothing more than dead skin. After that the various steps in the pigmentation follow.

During this erythematous stage there may be an itching of the skin, which varies from a very slight itch to a painful affair coming on in from six to thirty-six hours. This itching usually clears up by another exposure to the sun. Aside from being an

unpleasant symptom, there is no danger associated with it. If a temperature and fast pulse occur along with the itch, you can be sure the patient has been burnt and the burn will manifest itself on the second day with exfoliation of the skin.

The rôle of pigmentation is protective. It is a protection against burns and infection and against the irritating ultra-violet rays and it enables the body to withstand large doses of sun without any bad effects to the patient.

At first the skin is very white, and sickly looking. It is cold and clammy to the touch and resembles putty. When the pathologist attempts to obtain a drop of blood for a blood count he does so with difficulty. He must make a deep puncture in order to obtain sufficient blood for an analysis. After a few treatments the skin becomes warm and glossy, and finally becomes soft and velvety, bleeds easily and heals very rapidly. Infection and bed sores are unknown to sun patients. In some cases, edema of the part will occur. In others, there will be the formation of minute vesicles filled with a clear fluid, especially on bright days when a hot wind is blowing. These are just a few of the things that occur during the course of the tanning. In some cases, they do not call for special treatment; in others they do.

According to Kisch, after pigmentation takes place, there is seven times more blood in the skin than there was before starting sun treatments.

Under the influence of the sun, hemoglobin is increased, the sweat glands are stimulated and the organs of internal secretion are accentuated.

As for burns, I have taken the Thézac Porsmeur lens and focused it upon pigmented skin. After fifteen minutes, there was an erythema on the pigmented skin which disappeared in about one hour, while upon unpigmented skin a burn took place with blistering which lasted for several days.

When a patient first starts sun cure there is generally a loss of weight. This is due to poor appetite, a loss of water from the stimulated sweat glands and kidneys, and the general cachectic state. After the tenth day, the body becomes accustomed to the action of the light and air. The patient's appetite returns, and the weight that was lost in the first ten days is rapidly regained, usually in the same length of time in which it was lost.

In giving heliotherapy to surgical cases, we do not use casts or splints, but immobilization is obtained by means of traction and extensions. If

casts and splints were used the part of the body affected would be covered and no benefit would be derived from the sun, light and air. It is necessary that every part of the body be exposed to the sun if the patient is to receive any benefit. When a surgical case who is in traction is put out on the porch for sun, all apparatuses are removed, so that every part of his body will be exposed. When casts or splints are used, the muscles and tissue of the part encased in a cast will atrophy; on the other hand, when a patient is put in traction, the traction is removed once a day, and the patient's limbs or whatever part of the body is in traction, is massaged, so the muscles will not atrophy. In cast or splint cases an ankylosis generally takes place. In heliotherapy, we strive to obtain a cure with restoration of function.

Patients are allowed to drink all the water they care to while taking the sun bath. As yet, no harmful results have been noticed. As for food, we give our patients their breakfast while they are taking their sun baths. Last summer we tried giving them their dinners while in the sun and we did not have one gastric upset. So far, this year none of the children or women have experienced any intestinal disturbances. They have all had four hours or more of sun daily and have had both their breakfasts and dinners while taking the sun bath. Among the men, we have had a couple of complaints of nausea, I believe, due to eating while in the sun. These patients lay the disturbance to some other cause than the sun, but personally I believe the sun was the causative agent.

Recently my attention was called to the danger of sterility in those patients taking heliotherapy, especially in case of genito-urinary tuberculosis. This idea is erroneous. A loin cloth (not a bathing suit) is worn only as a matter of decency and not to prevent sterility. If sterility occurs it is due to some underlying pathological condition and not to the sun's rays. What better evidence have we than the Indian? One of the differences between a white man and an Indian is that the white man is face from his neck up while an Indian is all face.

Air and altitude do not play an important rôle in heliotherapy. The main principle in the treatment is simply to use the sun whenever it shines. A great many false impressions are formed by casual observers when they learn that children take heliotherapy during the winter. There is

nothing remarkable about this and false impressions should not be formed. In the first place, all the children during the winter have heavy overcoats of tan. They have lived in the open, their skin has been accustomed to the light and the air and when the thermometer drops to around freezing, those children who have had heliotherapy do not mind it. Secondly, the patients are not exposed in the winter unless the sun is shining, the day is not too cold, and there is no wind blowing. If a patient complains of being cold, he is immediately covered up.

A few facts to remember are:

1. Sunshine without rest is worthless.
2. Sun cannot be taken through glass or screen.
3. Patients cannot come to your office for artificial sunshine and expect to get well.
4. The mother, aunt, or sister cannot supervise the taking of sun any more than they can supervise the routine sanatorium care for pulmonary tuberculosis.
5. It takes trained workers to supervise heliotherapy.
6. In cases of bones and joints it does not mean operation, but it means applying orthopedic and surgical sense to heliotherapy.
7. Cancer and syphilis will not get well with sun treatment.
8. Remember that rest is just as important as sun.
9. The time of day, the season of the year, the character of the patient, and the amount of pulmonary tuberculosis must be taken into consideration.
10. No tan, no cure. The greater the tan the sooner and better the cure.
11. Sun cure does not cure all cases of surgical tuberculosis and a certain percentage fall by the wayside.
12. Hemorrhagic cases must be watched carefully and the time periods are cut to two-minute exposures instead of five-minute.
13. Genito-urinary tuberculosis cases are given tuberculin along with sun. We use Koch's O. T. and give it according to Pope's logarithmical scales.

In all cases of extra- or non-pulmonary tuberculosis, remember the following: If you are loath to dispense with casts, bivalve and remove



them during sun cure. Do not cover a hip with a cast and expect to give sun cure through it.

If you think you must operate, hesitate, give heliotherapy its opportunity first. Then you will operate only in very exceptional cases.

#### DISCUSSION ON THE FIVE PRECEDING PAPERS

DR. W. S. LEMON, Rochester: A symposium of this character cannot fail to impress one with the far flung attack of the bacillus of tuberculosis. It is true that the organism affects certain tissues more frequently than others, as evidenced by the preponderating incidence in the lungs, yet few tissues are exempt. The symptoms are the expression of a reaction of the tissue involved and represent the physiologic possibilities of that structure. It is not strange, therefore, that the evidences of activity vary and indeed are as different as are the reaction possibilities in the skin from those in the bowel, or those of the genito-urinary apparatus from those of bone.

It must be granted, of course, that the diagnosis has been proved by physical and laboratory examination, or by the use of tuberculin, or by histologic investigation of infected tissue. The first method is best designed to determine whether or not activity is present, because symptoms resulting from activity are a better guide to the diagnosis of an active lesion than are the physical signs or often the laboratory tests. In fact, constitutional symptoms may appear days or weeks even before recognizable anatomic changes have taken place.

The fundamental functions of the body are affected in much the same way regardless of the location of the lesion. Thus in a study of tuberculous enterocolitis, I found that the pulse rate, blood pressure and weight of patients were about equally affected, regardless of the location of the lesion in the bowel, or whether the lungs or other organs were likewise invaded by the bacillus of tuberculosis.

Tuberculosis is first of all a focal disease. The reaction to the bacillus produces an avascular cellular morbid structure lying within the tissue, and whether within lung, skin, kidney, bone or bowel, separated from it by a protecting layer of greater or less permeability, depending upon the degree of success of the protective mechanism of the particular individual infected.

One other factor of importance is connected with the possibilities of constitutional symptoms, namely, the activity of the enveloping structures. In this regard, Krause says: "It would seem that the intoxication of tuberculosis, in the natural evolution of the infection, is in large measure a nonspecific process brought about by the absorption of material from foci in amounts large enough to produce symptoms."

It is possible that the bacteria themselves or their degraded forms, or the products of the cellular material forming a focus, may produce intoxication and constitutional symptoms if the surrounding structures are in a physiologic state to favor absorption through vessel or lymph channel. Given an open vessel, a lymph channel or other channel of communication and bacilli may spread from a primary focus to other organs of the body. Im-

mediately, the tissues being hypersensitive, there is an outpouring of inflammatory elements, and acute reinfection is clinically diagnosed from the constitutional symptoms due to their absorption.

Thus the patient with pulmonary disease progresses badly in spite of good treatment when the kidney becomes involved from hematogenous infection, or equally badly when the bowel is involved, probably from the ingestion of germ bearing sputum. The later symptoms expressing the location of this process depend upon the interference with the physiological activities of the area damaged. In the skin these are expressed often as signs rather than symptoms and may be evidence of true histologic tuberculosis as in lupus vulgaris or as a localized nonspecific inflammatory reaction, as in the tuberculids. These latter may be compared to a tuberculin reaction, which is primarily an immune reaction associated with an acute focal inflammation. Stokes says: "They are cutaneous reactions to hematogenously distributed tubercle bacilli deposited in a hypersensitive skin and originating in a tuberculous lesion sometimes unrecognized."

I am confining my remarks entirely to a general consideration of tuberculosis rather than to its attack upon the various organs. Underlying all is a fundamental fact that we are dealing with tuberculosis itself, that the symptoms described are but the reaction of the tissue attacked, and are as varied as are the physiological functions of the several organs.

Dr. Bendes was good enough to let me have his paper before coming to this meeting and I wish I could add anything to it. It seems to me that he has described in detail in such a thorough way that anything that I might say would be superfluous. Anyone who is acquainted with the Rollier type of management and with the character of the Rollier treatment must know that he put into our hands a very useful weapon in the control of tuberculosis.

I have attempted to open this discussion by the mere use of generalities which will cover the diverse forms presented in the papers of the symposium. I wish to leave to the members of this society the privilege and the right to discuss the particular form that claims their interest.

DR. M. GEORGE MILAN, Thief River Falls: I desire to make a few remarks on the subject of non-pulmonary tuberculosis, particularly with reference to the paper presented by Doctor Marcle on gastro-intestinal manifestations of the disease. I imagine that Doctor Marcle did not have time to include in his paper points relative to diet in the care and treatment of these manifestations. I, myself, have come to the conclusion after six or eight years' observation in sanatorium work of cases wherein a gastro-intestinal complication accompanies pulmonary tuberculosis that we can do as much with diet in many of these cases as we can accomplish with any other single method.

The procedure in treatment to be followed from the dietary standpoint depends mainly upon two factors: first, attempts must be made to lessen irritation in the intestinal tract; and, secondly, we must bring into play any method by which peristalsis can be decreased and maintained at a level coincident with a normal functioning of the intestinal tract itself. Success in the handling of this

second factor will be dependent to a great extent upon our efforts in lessening local irritation. I have found that many patients when given milk in excessive amounts will develop indigestible curds in the bowels which in turn set up irritation. Well done meats, as well as sauces and preserved fruits, will often produce intestinal irritation in a great many of these patients.

We must not confuse ordinary dyspepsia with tuberculous enteritis. In a great majority of the pulmonary tuberculous cases that are complicated with gastro-enteritic disturbances tubercles are found in the intestines. It does not necessarily follow, however, that because evidence of tuberculous infection is found in the intestinal tract the gastro-intestinal disturbance is necessarily a clinical tuberculous enteritis. There is little question that when the pathology of these tubercles shows a state of activity the enteritis is probably due to the tuberculous condition. However, in the mild cases the intestinal tubercle may be found and still, being of a healed type, may not be causing any disturbance even though gastro-intestinal manifestations are present in the patient. In other words, even in the intestinal tract we must differentiate in the presence of tuberculosis whether there is clinical tuberculous enteritis present or only intestinal tuberculous infection without any clinical manifestations. When the first signs of abdominal trouble appear we must endeavor by all our available resources to learn whether or not it is the tubercle that is at the base of the enteritic trouble, or some non-tuberculous condition complicating the pulmonary lesion.

DR. H. T. HELMHOLZ: I would like to say a word about the cutaneous tuberculin reaction. I think the pendulum has swung too far in the opposite direction, in that we rely very little on a positive or negative tuberculin reaction. I think that is true if we use it in the way that it is ordinarily used, merely one or possibly two tuberculin reactions, according to Pirquet. As you all know, a positive tuberculin reaction means merely that some time or other the individual has had an infection with the tubercle bacillus. On the other hand, a negative tuberculin reaction, I believe, is of definite value, providing it is properly done.

One, two or more Pirquet reactions mean nothing. A gradual increase in the dosage of an intracutaneous reaction that remains negative even when as much as one or two milligrams are given I feel sure is of very definite value in excluding tuberculosis. We all know that miliary tuberculosis does not give a positive Pirquet reaction, but, if the dosage is increased, as has been shown by Hamburger and Casparis, even in those cases one can obtain intracutaneous reactions. Just recently we had an

experience with a different type of case where the tuberculosis was so completely healed that there was no reaction. In this case of tuberculosis of the spine we increased our dosage because we thought we were unquestionably dealing with tuberculosis. With one milligram of tuberculin given intracutaneously we obtained positive tests. So I feel that a negative tuberculin test, if properly carried out, is of great help in excluding tuberculosis.

DR. J. A. MYERS, Minneapolis: No one who has observed Dr. Bendes' patients at the Glen Lake Sanatorium can question his splendid results. Although the changes which occur in the body of the tuberculous treated by heliotherapy are not as well understood as in rachitic cases so treated sufficient data have accrued on the subject to prove that it deserves a very definite place in tuberculosis therapy. In my opinion heliotherapy has four distinct effects upon patients: first, the chemical action of the rays; second, a period of almost absolute rest which many patients would not take otherwise; third, a daily air bath which is of unmistakable value in treating tuberculosis; and fourth, the psychic effect. The patients feel that something is being done for them and often will remain under treatment much longer and consequently develop more permanent healing than otherwise would be obtained.

Every practitioner of medicine who treats tuberculosis should become familiar with the technique and the indications of heliotherapy. Too often we think such special procedures are for institutions and have no place in private practice. This is far from true and in fact would be undesirable. When we consider the large number of tuberculous patients in this state and the small number of sanatorium beds, it is obvious that more tuberculous patients must be treated by private physicians than by sanatorium physicians. Often it is a long time after an application is filed until a patient can be admitted to a sanatorium. It is not right that during this waiting period patients should be deprived of such special therapy as heliotherapy if it is indicated. Again, very few patients are cured in a sanatorium, but most of them return to their homes for a long period of convalescence during which time they are under the care of their private physicians, where indicated heliotherapy should be continued in the home.

In Minnesota considerable natural sunlight is available during the spring, summer and autumn months. On cloudy days and during winter months artificial sun lamps may be used in the homes. In every case heliotherapy in the home must be under the most careful guidance of a physician who not only prescribes the dosage but also keeps the patient under very close supervision.

## PROBLEMS ENCOUNTERED IN THE TREATMENT OF DISEASE OF THE BILIARY TRACT\*

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The results of operations performed for gallstones and inflammation of the biliary tract are, as a rule, satisfactory. Few fields of surgery offer as good results as does this one. There are certain problems which we are constantly encountering, and with which we are doubtless making some headway, but it is not always possible to secure the desired results. Our present ideas of the source of infection, and the manner in which it is distributed to the adjoining tissues are so different from our former conception that they may eventually help us to solve some of the problems. Inflammation of the liver, and probably also of the pancreas, in association with infection of the gallbladder, may account for the persistence of symptoms in some cases, or for their recurrence after the gallbladder has been removed. At present, it does not seem that this conception will change our plan of surgical treatment; however, it does suggest that the choice of procedure is the removal of the gallbladder.

Generally the clinical symptoms in cases of disease of the gallbladder are very definite and clear-cut, and a positive diagnosis can be made in most cases. Occasionally, however, the usual gallbladder syndrome is present, and yet at the time of operation it is impossible to find sufficient evidence of inflammation in the gallbladder or biliary tract to explain the symptoms adequately. In some cases, undoubtedly, the diagnosis has been incorrect and the symptoms were due to a lesion elsewhere; in others, I believe the trouble does exist in the biliary tract, but is not yet recognizable, as in early cases of primary hepatitis in which the gallbladder is only slightly involved; or in early cases of primary pancreatitis. Since we have been making careful observations on the condition of the liver and the pancreas when operating for gallbladder disease, we are recognizing changes that often exist in association with cholecystitis, which formerly were not interpreted.

## SYNDROME OF CHOLECYSTITIS WITHOUT MUCH INFLAMMATION IN THE GALLBLADDER OR IMPROVEMENT AFTER CHOLECYSTECTOMY

The symptoms in the following case (Case 1) led to the belief that the patient was suffering from cholecystitis. In spite of the fact that the findings were not definite, it seemed best to remove the gallbladder, and this was done some months ago. The patient reports that her condition is not much improved. This does not necessarily mean that the operation was a failure, for if she was suffering from a chronic hepatitis or pancreatitis, it is still possible that she may obtain relief through the operation. However, it is also possible that our interpretation of the case was not entirely correct.

Case 1 (A428477). Mrs. E. M., aged forty-three years, had had marked gastric disturbance for twelve years, characterized by irregular attacks of colic and belching of gas. Five years before coming to the Clinic, she had had a severe epigastric colic, with pain referred to the right shoulder. Morphine was necessary to control the pain. Residual soreness in the gallbladder area and slight jaundice followed. She had had many minor attacks since that time. She was markedly constipated, and it was necessary to regulate her diet.

The findings at examination were essentially negative. At operation, July 13, 1923, the gallbladder was found buried in adhesions and involved in a moderate inflammatory process. There was moderate hepatitis. Cholecystectomy was performed. The patient's convalescence was uneventful.

## CLINICAL SIGNS OF GALLBLADDER DISEASE WITHOUT MUCH EVIDENCE AT OPERATION OF DISEASE IN THE BILIARY TRACT

More than once, after a diagnosis of gallbladder disease had been made, I have had occasion at operation to refuse to do anything with the gallbladder because it appeared normal. However, some of these patients have returned in a comparatively short time because of the persistence of their trouble, and have been relieved by secondary removal of the gallbladder. Our experience suggests that inflammation may exist in the gallbladder or biliary tract with little if any gross evidence of it. In the future it may be possible to recognize the conditions which cannot be interpreted at the present time. In some cases in which gross evidence of trouble was not sufficient to warrant cholecystectomy, the gallbladder was opened and a specimen excised from the wall for microscopic examination. In an endeavor to reach a proper conclusion with regard to these cases, the ease with

\*Read before the Minneapolis Surgical Society, January 10, 1924.

which the gallbladder may be compressed, the thickness of the wall, the character of the bile, and the amount of fat deposit in the wall as an indicator of a chronic inflammatory process, have been considered, but even these details do not seem to help materially. Case 2 illustrates the type in which there are clinical signs of disease in the gallbladder without much evidence of disease at operation:

Case 2 (A445832). Mrs. R., aged twenty-five years, had had attacks of epigastric pain, every four to six months for four years. They lasted about a day, were accompanied by severe vomiting, and were often followed by slight jaundice, lasting a week. The pain was not referred, but was so severe as to require hypodermics. Between attacks, the patient had considerable gaseous dyspepsia with intolerance for greasy foods. During the last two years the character of the distress had changed somewhat, localizing at times (about a week prior to the menstrual period) in the right lower quadrant.

At examination the urine and blood findings were normal. The x-ray of the stomach was negative. Gastric analysis revealed total acidity 40, and free hydrochloric acid 20. At operation, November 6, 1923, very slight cholecystitis was found; chronic catarrhal appendicitis was present. The gallbladder and appendix were removed. The convalescence was uneventful.

#### SUBACUTE CHOLECYSTITIS, RUPTURED GALLBLADDER, WITHOUT MARKED SYMPTOMS

Case 3 is in direct contrast to Case 2, and illustrates how extensive the infection in the biliary tract may be without producing severe symptoms. The patient had never had sufficient pain to disable her to any extent, and at the time she presented herself at the Clinic, her examination was essentially negative, although it seemed from the history that she might have a mild degree of cholecystitis. At operation a day or two later, a ruptured gallbladder was found, many stones were present, and the infection, although of low grade, had a tendency to spread and form abscesses, which shows that a patient who has cholecystitis should, under ordinary circumstances, be operated on.

Case 3 (A445069). Mrs. D., aged forty-three years, had had a drawing feeling in the epigastrium with loss of appetite and moderate dyspepsia for two years before coming to the Clinic. She had dieted. There had been a loss of 35 pounds in weight. One month before, she had had an attack of generalized abdominal pain lasting one-half hour, and relieved by hot applications. She had vomited once, but had never been so disabled that she was obliged to go to bed.

The findings at examination were essentially negative, except for tenderness at the umbilicus. There was no free acid in the stomach. The condition was diagnosed as a possible cholecystitis. At operation, October 25, 1923, an

emphysematous gallbladder, which had ruptured into the liver, was found. There were many stones. The appendix was inflamed. Cholecystectomy and appendectomy were performed. Two Penrose drains were inserted.

The convalescence was uneventful.

#### ACUTE GANGRENOUS CHOLECYSTITIS

One of the problems of interest in connection with the study of these cases is the rapidity with which the gallbladder may become gangrenous. At the time of the operation, there is generally a little ascites, the gallbladder is usually practically free from adhesions, but tense and thick, and when removed, the mucous membrane is black and necrotic, apparently entirely devoid of circulation. It is possible that a stone (in cases of cholelithiasis), or an inflammatory process, may obstruct the neck of the gallbladder and interfere with the circulation, although when a stone blocks the cystic duct, a hydrops of the gallbladder usually results. It is more than likely that, in these acute gangrenous conditions, emboli form in the vessels as a result of the inflammation, and the gallbladder is completely destroyed. Such a condition is illustrated in Case 4. The patients frequently suffer with more or less constant excruciating pain, requiring morphin for relief. Often the condition is mistaken for pancreatic necrosis in association with cholecystitis. In such cases, however, there will be more shock and inability to control the attack, which terminates fatally within a few days. If the patient has a gangrenous gallbladder without pancreatic necrosis, there is usually not the same evidence of shock and general reaction. Most of these patients recover. However, it is my opinion that unless there are some definite contraindications, such black, necrotic gallbladders should be removed rather than drained:

Case 4 (A441154). Dr. S., a man, aged forty-six years, had had one mild attack of colicky epigastric pain, three months before coming to the Clinic, and one week before, a more severe attack, followed by residual soreness and toxemia. The temperature was 101°; soreness and some pain persisted.

At examination the right upper quadrant was very tender. The gallbladder was palpable and distended. There was a tinge of jaundice. The temperature was 98.6°. The leukocytes numbered 22,000. Operation was advised. The patient was kept in bed for five days. The temperature was 101°, but gradually subsided. The leukocyte count decreased to 10,100.

Operation was performed September 14, 1923, twelve days after the onset of the last attack. The gallbladder was found to be distended and gangrenous, the mucous membrane black, and stones were impacted in the cystic duct.



Cholecystectomy was performed. One split tube with gauze and one gauze pack were inserted. The drains were removed on the ninth and eleventh days. Convalescence was uneventful.

#### RECURRENCE OF CALCULI IN THE GALLBLADDER

Another problem which has been widely discussed is the recurrence of stones in the gallbladder after cholecystostomy. Although cholecystostomy is satisfactory in the majority of cases, symptoms continue to recur in too many instances to warrant its performance except in special cases. Usually the symptoms in these cases are due to the continuance of the infection in the gallbladder, or to the secondary formation of stones. Case 5 illustrates this point. Secondary removal of the gallbladder has been necessary in so many instances as to indicate primary cholecystectomy in most cases.

Case 5 (A56171). Mrs. G., aged fifty-two years. In 1911 the patient had had a cholecystostomy to relieve gallstone colic which had persisted for twelve years. Four years later, following a severe infection in her hand, the colics returned, and recurred about once a month, until the time of her admission to the Clinic. She had not had jaundice.

September 27, 1923, cholecystectomy without drainage was performed. The gallbladder was contracted and destroyed; one stone was impacted in its neck, but there were no other calculi. Convalescence was uneventful, and the patient was dismissed from the hospital on the sixteenth day.

#### COMMON DUCT STONE

When the common duct is involved in an inflammatory process or contains stones, a much more serious problem is presented. There is interference with the flow of bile into the intestine, usually resulting in jaundice. Common duct stone is distinguished from carcinoma of the ampulla, obstructive pancreatitis and other obstructing inflammatory conditions by interval attacks over a period of years, associated with more or less jaundice, which clears up in the interim between attacks. If the obstructing lesion is a neoplasm, the jaundice is usually painless and gradually deepens, although it may fluctuate from time to time. However, we must always bear in mind that some cases of common duct stone have associated painless jaundice, and that unless there is some definite contra-indication, an exploration should be made to determine definitely what the condition is. Most patients with common duct stone will get well, whether they are operated on during the interval between the attacks, when the jaundice is subsiding, or during the attack. In Case 6 the patient was allowed to go

home, because his jaundice seemed to be subsiding; the plan was to operate when the jaundice had disappeared. However, he returned in a few days much more deeply jaundiced, having had another attack, and it was necessary to perform the operation without further delay. Generally it is best to carry the patient along until he is as free from jaundice as possible. As a rule it is better not to remove the gallbladder from a jaundiced patient, but to drain it and the common duct separately after the removal of the calculi. Removal of the gallbladder during the stage when biliary cirrhosis is present sometimes leaves an oozing surface, difficult to control by suture, and necessitating gauze packing. Bleeding may occur when the pack is removed, and serious results follow. Furthermore, the gallbladder is nearly always completely destroyed and its removal later may not be necessary.

Case 6 (A445588). W. Z., a man, aged fifty-three years, had had a sudden severe epigastric colic, characteristic of that observed in association with gallstones, a year and a half before coming to the Clinic. Vomiting had been associated. One year later, painless jaundice occurred, and persisted, with the exception of a few short remissions. Chills and sweating had occurred almost every month, with deepening of the jaundice after the chills.

At examination, the patient was jaundiced, and had lost 25 pounds in weight. There were no other significant findings.

The patient returned home to have treatment with calcium lactate, but came back three weeks later with somewhat more marked jaundice and a coagulation time of ten minutes; it had been four minutes at the time of his first examination.

November 28, 1923, cholecystostomy and choledochostomy were performed. The gallbladder was destroyed and filled with stones. Stones were impacted in the ducts, several being removed from the hepatic ducts. One large Robson drain and one Penrose drain were used. The patient was dismissed on the twenty-fourth day with his wound healed, general condition improved, sclera white, and bowel movements dark.

#### COMMON DUCT STONE AFTER CHOLECYSTECTOMY

It has been suggested that the common duct is more prone to be the seat of stone formation after the removal of the gallbladder. This hypothesis was based on the assumption that the common duct would take up the function of concentrating the bile which the gallbladder had performed, but apparently this does not occur. Recently we sent follow-up letters to one hundred patients whose gallbladders had been removed more than twenty years before, and in a study of this series we have found only one instance in which there was reason

to believe that stone had formed in the common duct after the cholecystectomy. Case 7 is one in which stone was found in the common duct after removal of the gallbladder. It would be entirely possible to overlook stones at the primary operation, and it seems probable that these stones were in the ducts at the time of the cholecystectomy:

Case 7 (A439983). C. O., a man, aged fifty-six years. Because of colic and jaundice, the patient had had his gallbladder removed five years before coming to the Clinic. The jaundice cleared up within a year, but during that time he had had an operation for adhesions. Following this, he remained well until three months before admission, when he had chills, nausea, and jaundice, but no pain.

At examination, he was moderately jaundiced, with bile 3 on a scale of 4, in the urine. His coagulation time was twelve minutes, but this was reduced to five and one-half minutes by three injections of calcium.

At operation, September 11, 1923, multiple stones were found in the common duct, one in the left hepatic, and one lodged at the ampulla. The stones were removed with a scoop, and a Mayo-Robson drain inserted. The drain was removed on the eleventh day. The stools on the fifteenth day were greenish. The patient left the hospital on the twenty-third day, and was dismissed from the Clinic on the thirty-fifth day. The jaundice had almost entirely disappeared, the stools were dark, and the wound had healed. A letter received recently states that the patient has continued to improve.

In Case 8 it is definitely known that stones were present in the gallbladder at the time of the cholecystectomy which had been performed twelve years before. The patient was well for seven years before the occurrence of any further symptoms, and there had been no jaundice, chills, or fever at any time since the cholecystectomy, which could be explained by the fact that the stone which we found at the second operation was so small that it had not caused complete obstruction of the duct, although it was of sufficient size to produce typical symptoms. This may be a case in which the stone formed after the removal of the gallbladder:

Case 8 (A445943). Mrs. H. E., aged fifty years, came to the Clinic in November, 1923. In 1911, she had had cholecystectomy for typical gallstone colic, and stones were found. She was well up to 1918, but since then had had attacks similar to those before operation, coming on at first at long intervals, but later, once or twice a week. The pain was colicky, requiring hypodermics, and radiating to the back. There had been no jaundice, chills, fever, or rise in temperature at any time.

The physical examination was essentially negative. November 22, 1923, choledochostomy was performed, and a small stone removed from the common duct. The liver and pancreas were grossly normal. The discharge from the wound stopped on the thirteenth day, and the drain was

removed. The patient was dismissed on the twenty-fourth day in good condition.

#### CHOLANGITIS AFTER CHOLECYSTECTOMY

We have been much interested in a group of cases in which there was a continuance or recurrence of symptoms after cholecystectomy, and in which we operated expecting to find common duct stones, but were disappointed. All of the patients had had typical gallstone colics from three months to seven years after cholecystectomy. Jaundice was not a common symptom, and in no case was it deep. At the secondary operation we found the common duct dilated as is usual following cholecystectomy, whether stones are present or not. We opened and explored the ducts, passing probes and scoops up into the hepatic ducts and down through the common duct into the duodenum, but no stones were found. About four-fifths of the patients were relieved of their symptoms, whether from cholangitis, hepatitis, or pancreatitis, by secondary drainage of the liver ducts; however, it does not seem that this procedure is warranted at the time of cholecystectomy, as only a very small percentage of patients have sufficient trouble of this kind to warrant secondary operation.

Case 9 (A145261). Mrs. W. H., aged forty-seven years, came to the Clinic in October, 1923. In 1916, she had had a cholecystectomy for a strawberry gallbladder containing one stone. She was well until 1921, when she had a sudden chill, temperature 104°, and severe upper abdominal pain requiring hypodermics for relief. There was no jaundice. Since then, she had had intermittent attacks, about three months apart, consisting of severe pain, vomiting, chills, and fever. On one occasion only was there any jaundice. After some of the attacks, the patient had night sweats for one or two weeks.

The examination was essentially negative. At operation, October 24, 1923, the common duct was four or five times normal size. I had difficulty in introducing a probe, but succeeded in getting a hemostat through, and then a large scoop, but no stones could be demonstrated. A Mayo-Robson drain was inserted and left in place seventeen days, until drainage ceased. The patient was dismissed on the twenty-second day, with stools and skin normal.

#### CHOLANGITIS

Another group of cases, in which cholangitis seems to be the chief cause of the patient's complaint, presents a serious problem. Case 10 is representative of this type. Following cholecystectomy and drainage of the ducts, the patient was relieved for only three months. Then secondary drainage of the duct was established for three months, but this has not afforded relief, and at the

present time the patient is suffering from attacks similar to the original ones, consisting of chills, with a rise in temperature, but no pain or jaundice. Some of these patients undoubtedly should have long-continued drainage of the liver ducts by means of the Deaver T-tube, and if this particular patient returns, this treatment will be instituted.

Case 10 (A418277). C. P., a man, aged fifty-seven years, came to the Clinic in February, 1923. A few years before he had had a typical gallstone colic with jaundice, but after that remained well until 1920, when he again had epigastric colic, chills, fever and jaundice. A similar attack occurred in 1921, and another in 1922. The latter was not definitely colicky. During the last year the patient had had several attacks of malaise, chills, and fever, without colic or jaundice. Calomel gave definite relief.

At examination the liver was enlarged, but there was no jaundice. Examinations of the urine and blood were negative.

At operation, February 23, 1923, cholecystitis with cholelithiasis and associated cholangitis were evident. The common duct was dilated, but no stones could be demonstrated in it. Cholecystectomy and choledochostomy were performed. One Mayo-Robson drain was stitched into the hepatic duct. The patient was dismissed on the thirty-first day, with the wound completely healed. He went home and was free from trouble for three months. He then began to have attacks similar to those previously experienced, with a sudden rise in temperature to 103°. There were no chills. These attacks occurred weekly, lasted about three days, and were apparently checked by calomel. Smears and repeated blood cultures were negative. Quinin had no beneficial effect.

September 7, 1923, a Mayo-Robson drain was inserted into the common duct for prolonged drainage. Marked pancreatitis and hepatitis were present. The common duct was enlarged, but no obstruction was demonstrable. The patient improved, and returned home, wearing the drainage tube, which ceased to drain, or drained only intermittently, after two months, and was removed. December 30, he wrote that he had had a recurrent attack of fever lasting three days.

#### HEMOLYTIC ICTERUS AND GALLSTONES

Gallstones can be present without being a factor in the production of jaundice. It is always well to bear this fact in mind and remember that the patient may have hemolytic jaundice. Although there may be some relation between the existing cholecystitis and the biliary condition that attends it, removal of the gallbladder will not clear up the jaundice. The distinction between hemolytic and obstructive jaundice can be made by a careful study of the clinical history. In the former, there is usually a family history of jaundice, or the jaundice has existed since childhood. Furthermore, there is little if any bile in the urine, and the examination of the blood will show an increase in the

fragility of the red cells. The spleen is usually large and can be palpated. Treatment in these cases should consist of splenectomy, and removal of the gallbladder at the same time or shortly afterward; an operation for only one of the two conditions will not be sufficient.

Case 11 (A310506). A. R. M., a single man, aged thirty-one years, had been somewhat yellow as a child. There was no family history of jaundice. He had had severe attacks of epigastric distress when he was five years old, during an illness which was diagnosed pneumonia. The attacks recurred and had become more numerous during the last eight years. He was markedly jaundiced immediately after an attack, and slightly jaundiced between attacks.

At examination the patient was slightly jaundiced. There was no bile in the urine. The spleen was palpable. The hemoglobin was 75 per cent; erythrocytes numbered 4,430,000. There was moderately increased fragility of the erythrocytes. The x-ray revealed a diseased gallbladder containing stones.

At operation, November 19, 1923, the spleen was three times normal size (185 gm.), and was removed. There was moderate fibrosis and destruction of the malpighian bodies. The gallbladder was filled with stones, but it seemed best to postpone further operative procedure. November 30, cholecystectomy and appendectomy were performed. The gallbladder contained many stones, was thickened and inflamed. A marked hepatitis was present. The appendix was obliterated throughout.

#### WHITE BILE

It was formerly supposed that the presence of white bile in the common duct indicated that the liver function was entirely suspended, and that the case would terminate fatally, but investigations recently carried on at the Rockefeller Institute show that this colorless fluid in the common duct is not bile, but is secreted by the walls of the common duct under sufficient pressure to hold the bile back in the liver. Within a few hours after the duct is opened and drained, in most instances, the drainage changes and normal-appearing bile is seen. It is not known why we do not find this clear colorless fluid in all cases in which the common duct is completely obstructed. Experimental work has shown that if the common duct is ligated below the entrance of the cystic duct, so that the gallbladder retains its communication with the biliary tract, this white fluid is not secreted. In certain cases in which the gallbladder is out of commission, and complete obstruction of the common duct by stricture is suspected, a slight amount of bile may pass through the strictured area, and thus explain the absence of the colorless fluid. According to our observations in these cases of so-called white

bile in the common duct, the results of operations on the common duct are just as satisfactory as in any of the deeply jaundiced patients. In Case 12 there was a quantity of this clear fluid in the biliary ducts at the time of operation:

Case 12 (A294436). Mrs. C. C., aged forty-three years, came to the Clinic in October, 1919. She had had gallbladder disease since 1903, and cholecystectomy had been performed in August, 1918. Two months later, persistent jaundice had developed. She had lost 25 pounds in four months.

At examination jaundice was marked, and bile 2 was found in the urine.

November 4, 1919, hepaticoduodenostomy was performed. There was complete obstruction of the hepatic duct at the site of the cystic duct. There was no bile in the ducts, but 200 c.c. of clear fluid were found. The pancreas was normal. On the sixth day after operation there was slight drainage of bile from the wound, but none thereafter.

Convalescence was uneventful, and the patient was able to leave the hospital on the seventeenth day, with the wound practically healed, and the jaundice subsiding rapidly. In a recent letter, the patient writes that for two years after the operation she was in excellent health, but since then has had attacks of colicky abdominal pain at intervals of from two to eight weeks, very similar to those which she experienced before the removal of the gallbladder, in 1918.

#### STRICTURE OF THE COMMON DUCT AFTER CHOLECYSTECTOMY

One of the most serious complications we have to contend with in surgery of the biliary tract is the occurrence of stricture in the common duct after cholecystectomy. Undoubtedly some of these strictures result from technical errors; in other cases, however, it is impossible to determine just why stricture occurred, as the patients seem to have been entirely well for a number of months after the gallbladder was removed. During this time the bile apparently passed normally down the duct, and then without any known cause a painless jaundice developed. In certain instances as much as nine to twelve months elapsed without any indication that the lumen of the duct was not entirely normal. In some of these it seems possible that a hematoma formed, or that as a result of packing with gauze or a large drain, sufficient scar tissue may have developed to cause stricturing of the duct when the tissue had contracted. I am inclined to believe that since we are closing the wounds in more of these cases with little or no drainage, we have seen fewer cases with this very serious sequence.

Case 13 (A451152). Mrs. S. B., aged fifty-five years, came to the Clinic in January, 1924. She had had a chole-

cystostomy in 1913 without relief of symptoms. Following cholecystectomy, in 1921, her condition was improved for about one year, then there followed nine months of indigestion and some pain. During the last three months, she had had four or five attacks of sudden onset and great severity, requiring morphin. Chills and some fever were associated with these attacks. The patient was not free from jaundice at any time during these three months.

At examination, a small mass was palpated in the right upper quadrant. The patient was deeply jaundiced. The coagulation time was ten minutes.

Operation was performed January 2, 1924, after pre-operative preparation with calcium. The patient had biliary cirrhosis from stricture of the common duct following cholecystectomy. A small stone was found in the common duct above the stricture, and calculi were present in the hepatic ducts. The duodenum was opened at a point about 3.75 cm. below the pylorus, and a rubber tube passed into the opening, and also into the hepatic duct; the duct was then anastomosed to the duodenum over the tube.

#### MALIGNANCY IN THE BILIARY TRACT

Fortunately malignancy of the gallbladder is rare. When it does occur, stones are always found in association with the condition. It is sometimes difficult to distinguish between cancer of the fundus of the gallbladder and empyema with thickened walls and necrosis. Occasionally an operation may be well under way before it is realized that malignancy is present. Because of the rich lymphatic circulation between the gallbladder and the liver it is hardly conceivable that malignancy could exist in the gallbladder for any length of time without extension into the liver. Moreover, radical operations for cancer of the fundus of the gallbladder have not been very successful, probably because of this rich network of lymphatics. A case of cancer of the gallbladder with cholelithiasis (Case 14), and one of primary cancer of the cystic duct (Case 15) are reported:

Case 14 (A59903). Mrs. E. F. G., a woman, aged sixty years, came to the Clinic in August, 1923. She had had mild epigastric cramps for two years, and an attack of severe colic two weeks before examination. Three days after the attack, a lump was discovered in the region of the gallbladder. She had lost 10 pounds in weight in the last six months.

At examination, there was a mass in the region of the gallbladder. There were no other significant findings.

August 7, 1923, cholecystectomy was performed. Acute cystic cholecystitis was present, and cholelithiasis. A large cancer was found in the fundus of the gallbladder. A nodule was removed from the liver, and was reported "inflammatory" by the pathologist. Following operation, pleurisy with effusion developed, and a small quantity of fluid was aspirated. The patient was dismissed on the twenty-eighth day. She returned to the Clinic October 24, 1923, to be checked up on account of her fear of a return



of the malignancy. She was in good condition, felt well, and had an excellent appetite.

Case 15 (A446388). E. B., a man, aged fifty-six years, came to the Clinic in November, 1923. Two years before, he had had a sudden attack of colicky pain in the right upper abdomen, without nausea, vomiting, or fever. Several similar attacks followed, in some instances requiring morphin. Then the patient was well until three weeks before coming to the Clinic, when he had an attack of aching pain in the upper abdomen. At this time his home physician discovered a movable mass. The patient had lost 18 pounds in weight.

At examination, the hemoglobin was 73; the urine, normal. The phenolsulphonephthalein test gave a 60 per cent return. Roentgenograms of the bladder, ureters, and kidneys were negative, as were also the cystograms and pyelograms.

Operation was performed November 9, 1923. The palpable mass was found to be a large hydrops of the gallbladder. At the distal end of the cystic duct there was a mass 2.5 cm. in diameter, hard, indurated and intimately attached to the surface of the liver. This mass and the intact gallbladder were removed. The gallbladder contained about 300 c.c. of pus, mucus, and stones. An ulcerated carcinoma with a large gallstone firmly fixed in the center, involved about 1 cm. of the mucosa of the cystic duct. Two Penrose drains were used and were removed on the sixth and eleventh days, respectively. Convalescence was uneventful. The patient was dismissed on the eighteenth day after operation, with the wound healed.

This is the only case of primary cancer of the cystic duct that I have seen. The gallbladder was large and distended, and there were stones in it. The cancer in the duct was rather small and had not invaded the common duct; hence there was no jaundice. However, the growth was attached to the liver, and while removal was apparently satisfactory, I am afraid the ultimate results may be influenced by the fact that some of the lymphatics of the liver may be involved.

#### CONCLUSIONS

In conclusion I wish to emphasize the fact that the results of operations for inflammations in the biliary tract are, as a rule, very gratifying. The gallbladder may be removed, stones taken from the common duct and the biliary tract drained, and the individual return to a normal state of health in a short time with very slight prospect of ever having any further trouble.

The case histories which I have given here tonight are those of patients who have presented definite problems. It is through the study of groups of cases of this kind that we hope to be able to overcome our difficulties and make still further progress in the treatment of these patients.

#### DISCUSSION

DR. STRACHAUER: Dr. Judd has certainly very successfully staged an old-fashioned "hard time party," and, of course, it is from the mistakes and unsuccessful cases that we learn and profit. It surely must be understood, however, that the cases he has presented form a very small percentage and that the great majority of cases which have had a cholecystectomy performed have been successful and satisfactory and have had no occasion to return to Rochester or elsewhere.

The consideration of cholecystectomy versus cholecystostomy always comes up in the discussion of the subject of cholecystitis. My personal experience goes back not alone to the time when cholecystostomy was invariably performed, but to the time when it was considered desirable to suture the gallbladder to the parietal peritoneum. Some of the acute cases were sutured to the peritoneum and left for several days for adhesions to form before opening the gallbladder.

The results of cholecystectomy are so much more satisfactory than from cholecystostomy that there is no comparison. Even the laity have become educated to this fact, and I have had a number of patients, requiring gallbladder surgery, tell me that they wanted me to be sure to remove the gallbladder, citing the experience of some friend or relative who had had the gallbladder "only drained" without satisfaction and that later removal of the organ was necessary.

Cholecystostomy, when performed, except in the aged, debilitated and nephritic, should be done as the first step in a two-stage operation, the second stage being a cholecystectomy, and the acuteness of the infection in the gallbladder at the first operation being such as to contraindicate the immediate removal of the organ.

Regarding the acutely inflamed gallbladder I wish to particularly stress the following: As far as I am personally concerned I have never had nor seen one case of acute cholecystitis die without operation. The mortality chapter—the dark chapter—in surgery of the gallbladder has to do with acute cholecystitis. The situation is not comparable to acute appendicitis. The acutely inflamed appendix and the gangrenous appendix are prone to undergo rupture and perforation, and, of course, the diagnosis of acute appendicitis carries with it the indication for a prompt operation. Not so the acutely inflamed gallbladder. In my entire University Hospital experience and private practice I have seen only two cases of rupture of the gallbladder. In one of these the abscess was well walled off by the omentum and surrounding structures, and the patient, a man 79 years of age, was walking about the city of Minneapolis in comparative comfort. Both of these patients got well. We all know that operation on the acutely inflamed gallbladder is an extremely dangerous one. In removing the organ we open up a raw area of the liver which bleeds freely and offers an inviting avenue for the extension of the infection. Post-operatively the liver function is interfered with and acidosis develops. If these acutely inflamed gallbladders are operated upon, cholecystostomy as a first-stage operation should be performed. Personally, I put the patient to bed, in a hospital, on liquid

diet, with morphin to inhibit peristalsis, and avoid catharsis. Daily leucocyte count is made, and under this regime no case developed surgical complications nor required emergency operation. When the acute phase of the infection has subsided and the patient is taking fluids generously, eating and sleeping well, I go in and remove the gallbladder. The extra-hazard has passed and the patient can be safely operated upon. Bevan, among others, is one of the outstanding exponents of this practice of waiting for the favorable stage before operating and not unnecessarily exposing the patient to this avoidable danger.

It is extremely important to avoid the use of the cigarette or gauze drain, as the latter undoubtedly are responsible for inflammatory stricture of the common duct and adhesions in the neighborhood. I am confident that our increasing ability to close these cases without drainage will result in the elimination of a definite number of unsatisfactory post-operative results.

Dr. Judd called attention to the work of Graham and his associates on the relation of hepatitis to cholecystitis. Dr. Judd's slides show only the advanced degrees of hepatitis. By routinely taking a section of the liver for microscopic examination it is surprising how frequently a seemingly normal liver will show round-cell infiltration, indicating hepatitis. Dr. Graham believes that the route of infection to the gallbladder is by way of the portal vein to the liver and by way of the lymphatic communication between the liver and gallbladder to the latter organ. While this route of infection has not been absolutely proven, there is no question about the intimate relationship between the liver and the gallbladder, and the infection at various times, in all probability, travels both ways back and forth between the liver and gallbladder. The removal of the gallbladder breaks this vicious circle, and the illustrations shown by Dr. Judd this evening, in my opinion, emphasize the importance of an early removal of the gallbladder so as to prevent the increasing degree of hepatitis.

Surgeons are regularly confronted with the difficulty of establishing the diagnosis of chronic cholecystitis even when they can see and palpate the gallbladder at the time of operation. The color of the organ, the subserous deposit of fat, the thickness of the wall, the condition of the regional lymphnodes and presence of adhesions are, of course, all to be taken into consideration. Positive evidence at times, however, is absent in a case with a positive history of gallbladder disease. I wish to offer as a diagnostic procedure at the time of operation the removal of a section of the liver for immediate frozen section examination, and suggest that in the presence of round-cell infiltration the gallbladder be removed.

In conclusion, as a matter of passing interest I wish to cite the case of Professor Barker, of Baltimore, who, when 8 years of age, had typhoid fever; 35 years later, at the age of 43, he was operated upon for gallstones. Professor Chas. R. Austrian, bacteriologist at Johns Hopkins, grew a pure culture of typhoid bacilli from the gallstones, and there had been no repetition of the typhoid infection since the age of eight.

DR. A. E. WILCOX: The problems of gallbladder surgery have been most excellently exhibited in the cases shown

by Dr. Judd this evening. The difficulties encountered in determining real pathology from the gross appearance in the biliary area have been emphasized, and Dr. Judd's opening remarks emphasize one point which has always been a problem to me. That is, frequently we have a typical syndrome, and we are sure our diagnosis is correct, that is, cholecystitis or gallstones with positive indications for operative procedure, but upon opening the abdomen we find what appears to be a normal gallbladder, no stones are palpable and not a definite gross excuse for excision. In these cases we may find an accompanying diseased appendix, upon removal of which all symptoms cease. Yet, on the other hand, we periodically find that symptoms persist, and we are in a quandary as to what the real cause of the trouble is.

To state that the gallbladder is normal is a difficult problem. I am not sure that I know what a normal gallbladder looks like, or at least I am satisfied that a normal appearing gallbladder is very deceptive.

I believe that the clinical syndrome sufficient to make a diagnosis is sufficient indication for excision of the gallbladder providing the appendix shows no pathology. However, it is a matter of surgical judgment in each individual case as to just what will be done when the abdomen is opened in this type of case.

I have had excellent results since I have been encouraged to close some of these abdomens without drainage, and I feel a great step forward has been made by so doing.

The question of hepatitis, cholangitis, and pancreatitis are still problems to be solved and involvement of the common duct not only requires unusual surgical skill but rare judgment as well in determining between cholecystectomy or drainage of the gallbladder in conjunction with drainage of the common duct.

Dr. Judd's paper, as usual, has been extremely instructive, and his results are very consoling to those of us who meet these problems occasionally. We are deeply indebted to him for this interesting paper, and the society is to be congratulated upon having provided for its presentation.

DR. A. L. CAMERON: (Requested to cite his case which had been previously reported.) My case concerned a man thirty-two years of age whose history was quite typical of recurring attacks of cholecystitis without jaundice over a period of three years. At the time of operation the gallbladder was found to be greatly distended and tense. Upon palpation the cystic, hepatic and common ducts appeared normal. The gallbladder appeared quite acutely inflamed, and for that reason it was decided best to drain it. It was opened at the fundus and completely evacuated of a mucoid, colorless material.

Following this, normal looking bile flowed freely to the exterior. Evidently an obstruction had obtained in the cystic duct, presumably a mucous plug.

With my finger inside the gallbladder I determined definitely that no stones were present. The gallbladder wall was very thin and due to the absence of adhesions was readily palpated throughout. The gallbladder was drained.

Eighty-six days later, following several attacks of right upper abdominal quadrant pain the patient was again operated upon. At this time the gallbladder was found to be shriveled up, thick walled and full of stones. These

calculi without doubt had formed subsequently to the first operation.

DR. WILLARD D. WHITE: I was much interested in that part of Dr. Judd's paper which told about these cases where he got a pretty definite history making you think you had pathology in the gallbladder and then, when the gallbladder was opened, very little was to be seen pathologically. I was interested in that especially because I have seen cases where I think a definite mistake has been made because the history showed the attacks to have been quite severe. Some cases may require morphin. They may or may not vomit, may or may not have a slight rise in temperature, but usually do not. In this particular type of case you will find very often that the patient has been using cathartics very frequently over a long period of time so that he will get a definite bowel distress, which may very easily be confused with gallbladder distress. I think that one point in the early diagnosis is, as Dr. Judd mentioned in one case, that the distress would shift about. We all know from our physiology, if we stop to remember it, that the content of the bowel is fluid in the cecum and that as the material moves around more slowly it gets more and more hard and dry; so, in some of the cases, palpation of the abdomen will show that the content of the descending portion is fluid, whereas, normally, it is not fluid. Another point in diagnosis is trying to put the patient on accurate bowel management, to have him on such diet that the bowels will move without taking cathartics. In this way a lot of patients who have these attacks will have their supposed gallbladder trouble clear up. They will have so much distress with an attack that they will be afraid to eat large meals, or it may be that they will find that greasy foods are causing their distress, which is considered a point in favor of their having disease in the gallbladder. In these types of cases I think the thing to do is to put the patient on accurate bowel management and get the bowels working without taking cathartics. If they clear up it speaks against gallbladder disease. Of course, there are other things to take into consideration, such as the leucocyte count and temperature; but many of these bowel cases may have a slight rise in leucocyte count and this may help to confuse one. I have seen gallbladders after they have been removed and have heard the surgeon say, "I expected to find definite pathology in this gallbladder as the patient had a fairly definite history of gallbladder disease." Then, when you have asked him about the patient's bowel history, use of cathartics, etc., he will admit he knows nothing about it, having apparently not inquired into this part of the history. In some cases, when you go back and inquire from the patient, you will get a history of long-continued and frequent use of cathartics. At least some of these patients have their distress from an irritable bowel resulting from the use of cathartics and enemas. These, I believe, are the type of patients who, having been operated upon, will say sometime afterwards that they are having their old gallbladder distress, even though their gallbladders have been removed. It is admitted that many of the patients with gallbladder distress will have used cathartics and that their distress may be due to their gallbladders, even though they have used cathartics, but my point is that many of them have their distress from the abuse of cathartics and

enemas and that, therefore, the attempt should be made to establish that fact and avoid unnecessary and, consequently, disappointing operation.

DR. H. B. SWEETSER: The last statement made by Dr. Cameron as to the time of formation of new stones in the gallbladder is open to some question. It reminds me of a patient I operated on some years ago. He had acute cholecystitis with stones. The gallbladder was emptied of stones and drained. A few days later he died. At the autopsy stones were found in the hepatic duct and far up in the ducts of both lobes of the liver. It is easy to imagine that some of these stones could have reached the gallbladder if the patient had lived, and we might have interpreted their presence as an example of new stone formation.

Dr. Strachauer has said he has never seen a case of acute cholecystitis die, and that operation should be deferred till the acute symptoms have subsided. I have seen them die. Only last September, my chum in the medical school died following rupture of his gallbladder. He was taken suddenly sick on a Sunday with acute inflammation of the gallbladder, and was so sick that operation was postponed to allow of subsidence of the acute symptoms. The following two days he appeared better, but on Wednesday the gallbladder ruptured and on Saturday he was dead, notwithstanding a late operation. I cannot understand why we should continue the old idea that there is more danger in operating during the acute stage than in waiting. Years ago the same positive statements of increased danger were made during discussions as to the safest time to operate in acute appendicitis, but no one now delays operation in this disease. I am sure that my gallbladder cases with fever and a high leucocyte count stand a better chance from early operation than from procrastination. When the gallbladder is exposed, one may then decide whether to excise it or be content with simple drainage.

I was very glad to hear Dr. Judd's case of jaundice due to stricture of the bile duct, in which he was sure no injury had been done to the duct at the time of operation, since bile was present in the stools at first. I had a very similar case which caused me much worry. My patient also passed normal colored stools for a few days, followed by jaundice which deepened and with clay colored stools. Later I made an anastomosis between the common duct above the stricture and the duodenum. I also am sure the duct was not injured at the operation.

This has been a very enlightening and instructive paper which Dr. Judd has presented, the more so from the fact that he has elected to tell us of some of his discomforting experiences rather than of his many successes.

DR. R. E. FARR: I have enjoyed the paper and the discussion very much. I wish to call attention to a number of points and to especially stress some that have been made. I am glad to find surgeons changing their attitude toward the blind abdominal exploration. I have insisted for years that pathology which could be detected by this method could almost always be anticipated by a well-taken history, a good physical examination and properly correlated laboratory data. I recently heard Drs. Crile, Deaver and W. J. Mayo state that they had frequently removed gallbladders which contained stones they were unable to palpate.

The next point I want to mention relates to what we have termed the physiological test. We believe we have proven in a comparatively large number of cases that it is possible to reproduce the patient's pre-operative symptoms by squeezing or making traction upon the suspected viscus, i. e., gallbladder, appendix, ovary, et cetera, in the patient. Lowen has, by blocking the nerves supplying the appendix or gallbladder, been able to relieve the patient's pain, thus receiving great aid in diagnosing between appendicitis and cholecystitis.

Dr. Judd in his message tonight has called attention to what might be called "freak" cases. It must be from a large series of gallbladder cases that so many unusual conditions have been found. I have had considerable trouble in some of my gallbladder work, but it has been as a rule most satisfactory.

I agree with Dr. Sweetser that it is entirely possible that the gallstones found in Dr. Cameron's case formed in one of the hepatic ducts and were present when he opened the gallbladder the first time. I have in a number of instances, after completely emptying the gallbladder and draining it, found a number of gallstones upon the dressings after the removal of the tube. I would like to ask Dr. Judd if he has not had the same experience. I do not see that Drs. Cameron and Strachauer have proven their point that these gallstones formed during the period between his first and second operation. In relation to the length of time it takes gallstones to form I had an opportunity to make an important observation. Many years ago, while taking care of a man for typhoid fever he developed an acute attack of cholecystitis. He afterwards insisted that this was his first attack. Ninety days after the onset of this attack I performed a cholecystostomy upon him on account of recurrent colics. As the gallbladder was sponged out with gauze numerous small gallstones were removed. From these pure cultures of typhoid bacilli were obtained. As he had never had typhoid fever before it seemed reasonable to assume these stones had been ninety days in forming. However, if Dr. Cameron's reasoning is correct, the stones in his case were developed four days earlier than in mine.

Dr. Judd, closing: Dr. Strachauer and Dr. Farr have both emphasized one of the points I wished to make in this discussion—that gallbladder surgery, as a rule, is extremely satisfactory.

Each of the cases I presented here tonight illustrated some point about which we are not entirely decided. By studying cases in this way, we should be able to improve our results, though I believe the outcome is satisfactory in 90 per cent of the cases.

Dr. Farr asked me whether I had ever found stones on the dressings in cases where no stones were found at the time of the operation. I have had this experience, and of course, I have always been in a quandary as to what part of the biliary tract the stones came from.

Dr. Cameron's report brought up a most interesting point—the length of time necessary for gallstones to form. When I first heard the report I felt that he had not emphasized the methods and detail of the examination of the gallbladder at the initial investigation. This case suggests the rapidity with which stones may form.

## HYPERTENSION IN PREGNANCY\*

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For many years it has been deemed advisable to make routine examinations of the urine during pregnancy. More recently, especially in the last fifteen years, considerable attention has been given to the routine observation of blood pressure during pregnancy. The purpose of these two methods of examination is to detect disease conditions before the mother and her unborn child have been seriously injured by the inroads of disease. The pathologic conditions with which we are particularly concerned are the toxemias of pregnancy. Inasmuch as we are in ignorance of just what these conditions are, we are unable to tell whether we are dealing with one or several disease conditions. We know something of the pathology in the cases which terminate fatally. We know little of the effect of these disease conditions upon the subsequent life of the patient. A careful study of the blood pressure of pregnant women may not only help us to protect the individual from the ravages, but also throw some light on the problem, of the toxemias of pregnancy.

We should guard against the consideration of blood pressure as an isolated condition in any case and especially in pregnant women. We know relatively little of the significance of blood pressure. Hypertension presents many unknown factors and unless extreme or associated with other abnormal conditions its significance in a given case should be determined only after careful scrutiny of other factors in the case. In pregnancy, hypertension is a finding of considerable importance because of its well known association with the toxemias of pregnancy. Much has been written concerning high blood pressure in pregnancy, but aside from showing its almost constant association with the eclamptic toxemias, little has been done to determine the real significance of hypertension during pregnancy.

So far as the literature goes, very little attention was given to blood pressure in pregnancy toxemia prior to 1907. Partridge in articles written in 1903 and 1907 made no mention of the use of blood

\*Presented before the annual meeting of the Minnesota State Medical Association, St. Paul, October, 1923.



pressure readings in the diagnosis of this condition. Allen in 1905 quoted Kroenig to the effect that eclampsia is accompanied with high blood pressure. He also quoted Richardson, who estimated the maximum blood pressure in a case of eclampsia at 208. Allen considered it to be an impractical method of diagnosis. He thought digital compression might give some information of value as to the amount of tension.

Vogeler in 1907 reported a series of fifty cases with observations during labor. He considered all cases with a pressure below 100 to be hypotension. The hypertension cases he grouped into moderate, under 180, and extreme, above this figure. Vogeler drew the following conclusions:

1. Normal blood pressure during pregnancy is 100 to 150 mm.
2. The pressure is higher during labor, but any postpartum pressure above 150 mm. or below 90 mm. is abnormal.
3. Hypotension less than 90 mm. indicates hemorrhage.
4. Hypertension above 150 needs watching.
5. Hypertension 150 to 180 is incompatible with completion of full term pregnancy and labor.
6. Marked hypertension over 180 is a grave symptom.
7. Hypertension with convulsions is an absolute indication for emptying the uterus.
8. Marked hypertension persisting in spite of treatment in connection with edema and cerebral symptoms is dangerous even without convulsions. Termination of pregnancy is indicated.

Skell (1909) thought the normal pressure was about 130 during pregnancy. A pressure of 160 to 180 does not exist in normal pregnancy. He considered the absence of albumen or a trace of albumen to be of no value in determining the existence or non-existence of toxemia. A progressively increasing quantity of albumen indicates trouble. For this reason he believed that blood pressure observations during pregnancy have an increased importance. Digital compression to determine arterial tension is of no value. Any blood pressure in excess of 150 mm. during pregnancy is abnormal. Blood pressure may be somewhat elevated during labor, but should become normal subsequent to labor. Blood pressure is elevated in both eclampsia and pre-eclampsia.

Bailey (1911) considered the average blood pressure in the last weeks of pregnancy to be 118 mm.

A blood pressure rise over 150 mm. requires investigation. In eclampsia blood pressure is about 200. It may be as low as 155. Convulsions are not apt to occur when the blood pressure is lowered by a poor resistance or drugs. He thought treatment should not be directed especially toward the reduction of the blood pressure.

Judd (1912) wrote that hypertension in itself may require treatment. He thought that eclampsia may be foreseen by blood pressure observations. Hypotension may foretell shock or concealed hemorrhage. He believed the gravity of the case may be determined by the height of the blood pressure and the amount of serum albumen and serum globulin in the urine.

Lynch in 1913 analyzed one hundred private cases. He found only 8.2 per cent with a blood pressure between 121 and 145. He quoted Davis' figures of blood pressure readings in sixty cases during the puerperium, of which 25 per cent had a blood pressure between 131 and 140; it was over 140 in 4 per cent of these cases. He found no relationship between the blood pressure and the percentage of albumen. He reported two cases of eclampsia with very slight if any elevation of blood pressure.

Malcolm Donaldson in 1913 found a uniformly high systolic pressure in a series of cases with albuminuria. In toxic cases the blood pressure tends to fall quickly to normal following delivery. He considered a rising blood pressure to be an indication for the termination of pregnancy.

Hirst (1915) considered hypertension to be more significant of late toxemia than urinary or other changes. He believed that the ordinary systolic pressure of eclampsia is 180. In severe cases it is apt to be over 240. The blood pressure is apt to remain high for ten days or more after the disappearance of other symptoms. He advocated the lowering of blood pressure by sweating, purgation, veratrum viride, rupture of the membranes, and venesection when it is above 180.

Barnard thought that any blood pressure rise above 140 is abnormal. In his series of 200 cases, 18 had a pressure of 140 to 225. All of these cases had albuminuria. All his eclamptics except one had a marked elevation of pressure. This was 145 until after delivery.

Riesman (1915) was of the opinion that blood pressure readings during pregnancy are of par-

ticular importance. He mentioned three forms of hypertension: (1) associated with nephritis; (2) accompanying arterio-sclerosis; (3) a mysterious form occurring in middle age without apparent renal involvement.

Newell (1915) reported 450 cases. He said that many women show a temporary rise in blood pressure during pregnancy. Five of his patients had a blood pressure of 140 or over. He considered the rise in blood pressure to be an indication of possible toxemia even in the absence of other symptoms. He thought that the age of the patient did not influence the blood pressure during the child-bearing period. He believed that there is a tendency toward an increase of blood pressure with each subsequent pregnancy.

Litzenberg gave an analysis of blood pressure in 524 cases. About 20 per cent had a rise above 130. The diastolic pressures give no more information than the systolic, though a relatively high diastolic pressure may be of significance. About 11 per cent of his cases showed a diastolic pressure above 86. Dr. Litzenberg stated that about 3 per cent of the patients with a systolic pressure between 130 and 140, about 9 per cent of those between 140 and 150, one-third of those between 150 and 160, one-half of those between 160 and 180, and practically all with a pressure over 180, have toxemia. Albuminuria occurred without hypertension in about 31 per cent of his cases, and hypertension without albuminuria in about 46 per cent of them. Irving found hypertension occurring before albuminuria twice as frequently as albuminuria preceding hypertension. Eclampsia may occur without hypertension.

Danforth reported 115 private cases. He thought that the average pressure of the pregnant woman is less than that of the non-pregnant. He believed that labor causes a rise in blood pressure, and that toxemia of pregnancy is accompanied by hypertension except in rare instances.

Warfield (1919) divided hypertension cases into subacute and chronic. He thought that in some individuals it is a normal condition and that it runs in families and may be hereditary. He believed that in itself it is not dangerous and does not represent a pathologic process. He stated that no obstetrician does his full duty if he fails to take blood pressure frequently during the last half of pregnancy. He considered three types of chronic hypertension: (1) the chronic interstitial nephrit-

ic; (2) the essential or hereditary; (3) the arterio-sclerotic. Each of these have different grades and may occur in combination.

Schulze (1920) reported a series of fifty cases from the fourth to the ninth month of pregnancy. He estimated the average pressure to be slightly higher for the latter months of pregnancy. He found that the average of 75 readings at term was 123, of 86 readings in the second stage to be 113, of 104 readings three hours postpartum was 120.

Kosmak in 1922 quoted Zangmeister to the effect that edema of the brain is associated with high blood pressure in eclampsia. He considered that the lowering of the blood pressure by venesection tends to reduce the convulsions, and the tendency to edema and hemorrhage of the brain.

De Snoo (1922) agreed with the theory of Bar that there is a close relationship between high blood pressure and sodium chloride retention. He emphasized the importance of treating his pre-eclamptic and eclamptic cases with a salt-free diet. He divided his hypertension cases into three groups: (1) previously healthy women with normal blood pressure who again become normal after delivery; (2) women with latent or chronic nephritis having hypertension; (3) women with primary hypertension. In *Group I* the cases have sodium chloride retention leading to edema. The long standing retention of sodium chloride leads to albuminuria and hypertension. He considered hypertension to be the most important sign of threatened eclampsia. He quoted cases of eclampsia developing without other signs than hypertension. He knows of no cases of eclampsia without hypertension. In this group of cases the blood pressure returns to normal in about fourteen days. Persistently high blood pressure indicates latent or chronic kidney disease. *Group II* (nephritic). These cases do quite well the first half of pregnancy. Hypertension develops in the second half associated with headache, albuminuria, tendency to bleed, and visual disturbances. According to his view, eclampsia occurs almost exclusively in primiparæ and it is not apt to recur. There is a tendency to recur in the nephritic type. In this group the blood pressure drops to its usual level about fourteen days postpartum. *Group III* (primary hypertension). This represents a small group of cases. There is no toxemia in these cases. There is no increase in blood pressure during pregnancy. The pregnancy proceeds without complications.

The hypertension in itself might lead to placental hemorrhage and its premature detachment. Out of 31 women with premature separation of the placenta, 22 had hypertension, 18 of the 22 had normal urine. He stated that the best treatment for hypertension cases is rest and salt-free diet. When the blood pressure returns to normal, even with albuminuria, he thinks the pregnancy may be allowed to continue. Repeated venesection has in his hands been without material result, producing only a temporary drop in pressure. He thinks that every pregnant woman with hypertension even without other symptoms should have rest in the latter months of pregnancy.

It is readily seen from the above review of the literature that blood pressure observations during pregnancy have assumed an importance equal to if not greater than the routine urinary examinations. The almost constant association of hypertension with toxemia is well established. It is also definitely recognized by a few that the so-called eclamptic toxemia is not the only cause of hypertension during pregnancy. The problem of hypertension is difficult to unravel because of the numerous factors which enter into its production. It becomes still more complicated because we may have combinations of conditions operating in individual cases. This is particularly true during pregnancy. A normal healthy woman who is pregnant may develop an eclamptic toxemia with hypertension. A woman with hypertension may become pregnant and go through the period of gestation without complications. She may, however, have an eclamptic toxemia superimposed on her pre-existing hypertension. Another woman with a nephritis and an associated hypertension may pass through pregnancy without serious aggravation of the previously existing condition. She may, however, have an exacerbation of the nephritis or develop an eclamptic toxemia superimposed upon the previously existing nephritis and hypertension. These different possibilities must be considered in evaluating the symptoms and findings in any case. Necessarily the opinion formed regarding the condition or conditions present modifies one's judgment as to the proper course to pursue. It is apparent that the hypertension present at the time of observation cannot be the only factor which influences our decision. Antecedent blood pressure observations are of the greatest assistance and one should never

make a judgment on hypertension alone, especially when only one observation has been made.

In order to clarify somewhat the situation regarding blood pressure observations during pregnancy, I have selected a short series of cases which I wish briefly to report together with their blood pressure curves. These observations are not perfect nor as complete as one might wish, but do, I think, bring out certain points of value. Before, however, proceeding with these individual cases I should like to report the blood pressure findings in a series of 38 cases of eclampsia admitted to the Minneapolis General Hospital. These cases were analyzed by Dr. Collier of the resident staff. Of these cases, about 79% were primiparæ, 21% multiparæ. The average age was 25.7 years. The youngest was 17 and the oldest 45. The average blood pressure on admission was 182 systolic and 110 diastolic. On discharge the average blood pressure was 121 systolic, diastolic 72. Of these patients about 18% had no convulsions; 37% had convulsions before and after delivery; 29% had convulsions before delivery, and 16% after delivery. The average stay of these patients in the hospital was about 19 days. About 79% of the patients lived. About 16% died from eclamptic toxemia, and about 5% died from complications.

#### HYPERTENSION DURING PREGNANCY Case of Mrs. D.S.

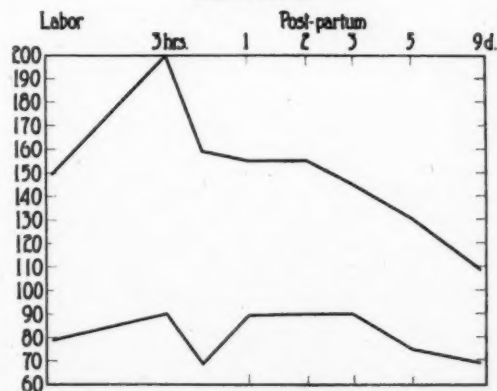


Fig. 1, Case I.

Graph of blood pressure readings.

We will now proceed to show the blood pressure findings in a few illustrative cases. These cases represent different types and in some the blood pressure findings extend over a period of several years; and perhaps will give an idea of what ultimately happens in these cases, not only

in one pregnancy, but in successive pregnancies. It would be much more valuable, of course, if one could follow these cases with rather complete observations for a considerable portion of their lives, but naturally that is very difficult to accomplish. Some of these records have been compiled not only from my own personal observations, but from the records of other physicians. Most of them are private cases and could, therefore, be followed a little longer and perhaps more closely than those who enter the charity wards of general hospitals.

**Case I.** Mrs. D. S. Age: 19 years. Para I. Grav. I. She had had headache and abdominal distress of dull type all during pregnancy. She was admitted to the Minneapolis General Hospital on January 27, 1922, and was in the hospital for ten days, being discharged on February 6, 1922.

Diagnosis: Parturition O.D.A. Eclampsia—Puerperium.

She was delivered at 12:50 P. M. on January 27, 1922. Convulsions started at 3:30 P. M. Before delivery the blood pressure was 148/78, and at 3 P. M. it went up to 200/90. Edema showed up after the second stage, at which time there was edema of both ankles. There had been no edema up until this time. There was a rapid rise in blood pressure. She had three convulsions that afternoon.

The urine before delivery showed a faint trace of albumen, no sugar or casts, specific gravity was 1023. After delivery there was a large amount of albumen, no sugar or casts, and the specific gravity was 1020.

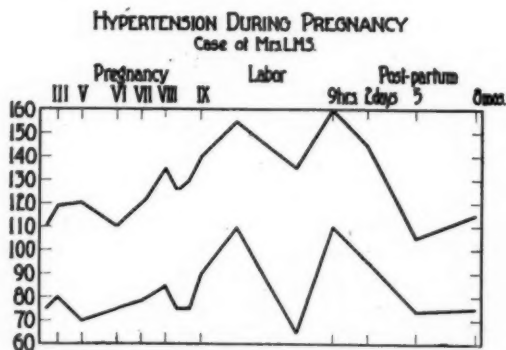


Fig. II, Case II. Graph of blood pressure readings.

**Case II.** Mrs. L. M. S. Age: 37 years. The patient was first seen in July, 1915. She had had measles in childhood. She consulted me on account of sterility. Her physical condition was good. She next consulted me on November 9, 1915, at which time she was  $2\frac{1}{2}$  months pregnant. Early pregnancy was uneventful except for an attack of possible appendicitis in November. She had no headache or edema. She felt well in January, having no headache or edema. There were no untoward symptoms in February. About the ninth month she suddenly developed epigastric pain and edema with hypertension and marked albuminuria and

numerous casts. The epigastric pain occurred at about 11:30 P. M., at which time she also vomited. At 6 A. M. she had a convulsion which lasted ten minutes. A Caesarean section was done at 11:30 A. M., May 29, 1916, before which time she had had three convulsions. She was delivered of a viable child. A hysterectomy was also done because of numerous fibromyomata. On June 17, 1916, she was still having considerable headache. There was no disturbance of vision. On June 20, 1916, a diagnosis of cystitis was made. She made an uninterrupted recovery. She was seen again in October, 1916, at which time the blood pressure reading was 104/68-78. She was later seen in May, 1917, one year after the birth of the child, at which time she was feeling well. The baby's general condition was also good.

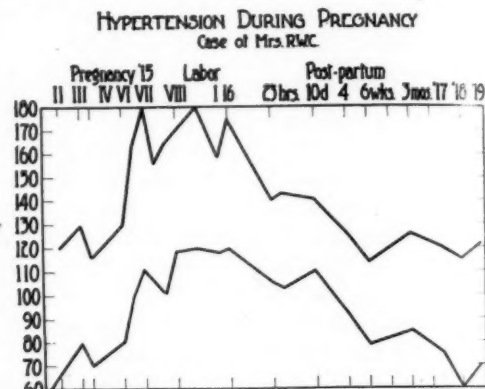


Fig. III, Case III. Graph of blood pressure readings.

**Case III.** Mrs. R. W. C. Age: 26 years. No acute illnesses. Weight 105 pounds. No hypertension.

She was first seen in 1915, at which time she was a little over two months pregnant. She had marked nausea and vomiting with pyrosis and salivation. About four and one-half months later she developed edema, epigastric distress with hypertension and albuminuria. She was treated expectantly in the hospital and delivered of twins about one month later. Labor was induced and she had convulsive attacks. She made a good recovery.

Over a year later she had another pregnancy, with vomiting and albuminuria, for which she had a therapeutic abortion. Subsequently she developed a pyelitis.

About nine months later she had another pregnancy with hyperemesis, albuminuria, and convulsions in the third month of gestation, for which the uterus was emptied.

Two years later she had another pregnancy with hyperemesis for which a therapeutic abortion was done.

About nine months later she had an appendectomy.

**Case IV.** Mrs. G. J. B. Age: 34 years. She was first seen in 1914, at which time she was about four months pregnant. She had two previous pregnancies with miscarriages. She had no acute illnesses except a suppurative otitis media two years before. Her physical condition was good, except for an acute attack of appendicitis. She developed an acute tonsillitis and operation was deferred until about two weeks later when an appendectomy was done.



The urine showed no important findings. She had slight hypertension. She felt well and had no edema until about January 26, 1915. Her hands were somewhat puffed. On February 6, 1915, she had a little headache. There was edema of the hands and feet. On this day she was sent to the hospital. About this time she developed a slight albuminuria with a few hyalin casts. She had very marked edema, and marked eye signs. Fundal examination of the eyes showed no demonstrable lesion. Labor was induced on March 1, 1915. On March 3, 1915, she was delivered of a still-born child. After the delivery the patient was dizzy and had some trouble with vision. The placenta was retained, but came away on the sixth of March, three days after delivery. On the twentieth of March the patient left the hospital, her general condition good, but she had some difficulty of vision.

**Case V.** Mrs. M. Z. Age: 30 years. Para I. Grav. II. Diagnosis: Parturition O. L. A. Toxemia of pregnancy. Eclampsia of parturition.

She was admitted to the Minneapolis General Hospital on January 6, 1922. She appeared confused. She had three convulsions and considerable edema. The blood pressure at this time was 164/110, and the urine showed a large amount of albumen with a few casts. She was delivered at 3:45 P. M. and at 8:55 P. M. she had another convulsion. She was still irrational the next day and there was a good deal of edema. Two days later she had a severe headache and some edema. Five days after delivery she had a typical eclamptic convulsion. At this time the urine showed a moderate amount of albumen with very many casts both hyalin and granular.

#### HYPERTENSION DURING PREGNANCY Case of Mrs. G.J.B.

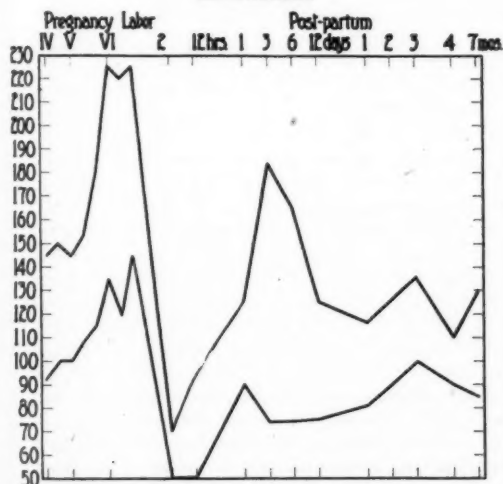


Fig. IV, Case IV. Graph of blood pressure readings.

**Case VI.** Mrs. C. Age: 23 years. She was admitted to the University Hospital on October 12, 1921, and was discharged December 17, 1921. Diagnosis: Pregnancy abnormal O. L. P. Acute nephritis of pregnancy.

At the time the patient was admitted to the hospital she

was seven months pregnant. She had had no miscarriages. There was no venereal history. She had frequent tonsillitis and quinsy. Upon admittance to the hospital, fluid was found in the abdomen and pleural cavities. There was edema of the hands, feet, ankles, legs, thighs, and face.

#### HYPERTENSION DURING PREGNANCY Case of Mrs. M.Z.

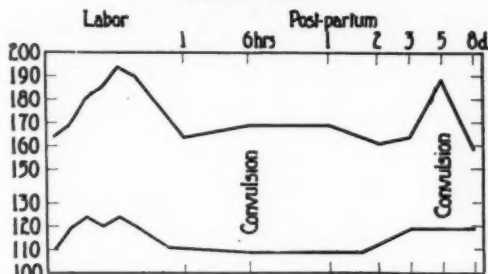


Fig. V, Case V. Graph of blood pressure readings.

This had been progressive since October 17, 1921. She had albuminuria, headache, blurring and spotting, scotomata, and hypertension. She had felt well until about one week before admission. She was kept under observation for a month, the edema increasing all the time. She was delivered on November 14, 1921, of a living baby, after induction of labor.

When the patient entered the hospital she showed a four plus albumen. This continued four plus until delivery, then there was a large trace and a very large trace. The specific gravity varied from 1.017 to 1.016. There were hyalin and granular casts on admittance, and occasional casts afterward. There were none for several days before delivery.

On March 30, 1923, she was again admitted to the hospital. Diagnosis: Toxemia of pregnancy. There was no nausea or vomiting with this pregnancy. There were no convulsions. The urine showed a large amount of albu-

#### HYPERTENSION DURING PREGNANCY Case of Mrs. Ch.

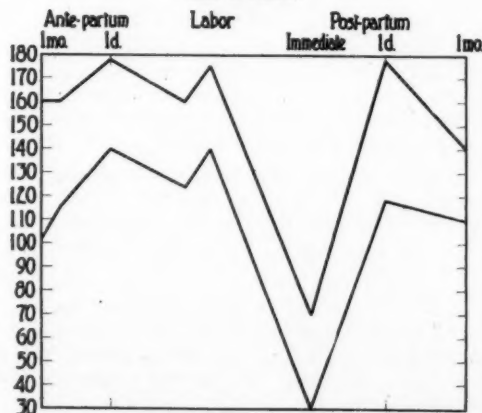


Fig. VI, Case VI. Graph of blood pressure readings.

men, carrying from two to three plus. Blood pressure varied from 140 to 180 systolic and 90 to 110 diastolic. Labor was induced at the eighth month and she was delivered of a living infant.

#### HYPERTENSION DURING PREGNANCY Case of Mrs. R.D.M.

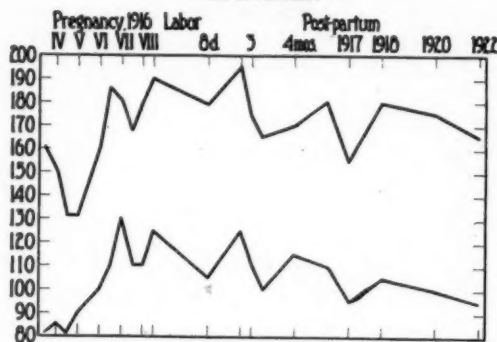


Fig. VII, Case VII. Graph of blood pressure readings.

**Case VII.** Mrs. R. D. M. Age: 36 years. She was first seen on February the fifteenth, 1916. She had had measles, scarlet fever, and typhoid fever. This was the third pregnancy. The first pregnancy resulted in still-birth after induction of labor for eclamptic toxemia. The second pregnancy resulted in a miscarriage at the third month.

When first seen the patient was in good health. There was little evidence of organic disease. The urine showed nothing of importance. She had some hypertension. She was first seen about the fourth month of pregnancy. About the seventh month she developed considerable edema, but no subjective symptoms. At this time she had plus albumen in the urine. She was sent to the hospital and kept on rest and diet. Labor was induced about ten days later. She was delivered of a viable child. She has been in fairly good health. There have been no subsequent pregnancies.

In 1917 blood chemistry: Nitrogen 32; urea 36; creatinin 1; uric acid 3.1; glucose .079. P. S. P. test was 70% in two hours. Day urine was 726 c.c. sp. gr. 1005 to 1027. Night urine 308 cc., 8 grams of sodium chloride excreted 7.1. Intake of thirteen grams of nitrogen excreted 8.2. The urine showed a faint trace of albumen, and a few hyalin and granular casts. A diagnosis of possible glomerulo-nephritis was made.

In January, 1920, her blood pressure was still high. In November, 1920, her blood pressure was 175/102. She complained of her joints being swollen. In January, 1922, she was feeling quite well. At this time her blood pressure was 164/94.

**Case VIII.** Mrs. G. B. F. Age: 41 years. Para III. Grav. V. Of the four previous pregnancies, two were somewhat premature, one at term, and one miscarriage. There was no history of toxemia. She had had measles, but no other acute infections.

When first seen on February 10, 1921, she was in the

second month of pregnancy. At this time she had a slight hypertension. Her body weight was 205 pounds. The urine was negative until the sixth month, at which time there was a faint trace of albumen. The urine never showed more than a trace of albumen, no casts, and only a few pus cells.

She later developed hypertension, had marked edema, some headaches, scotomata, tendency to dyspnea, and stiffness of the joints. She improved very little under rest and diet.

Labor was induced with a Vorhees bag on July the twentieth. She was delivered of a premature viable infant about five hours later. Her subsequent health has been quite good.

**Case IX.** Mrs. J. B. Age: 38 years. She consulted me on September 14, 1920, because of apparent sterility.

#### HYPERTENSION DURING PREGNANCY Case of Mrs. G.B.F.

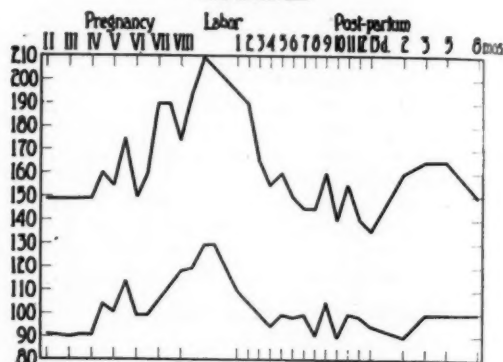


Fig. VIII, Case VIII. Graph of blood pressure readings.

She gave no history of a high blood pressure. She had chicken pox and measles in childhood, flu pneumonia about one year previously. When first seen her physical condition was good. She was next seen about five months later when she was about 2½ months pregnant. At this time she had slight hypertension. Fetal life was felt April the fifteenth. On May the twenty-seventh she was in the hospital under rest and diet with some improvement. Blood chemistry: Bld. sugar .15; creatinin 2.2; urea nitrogen 18.2; uric acid 1.6; alkali reserve 59.7; sodium benzoate 86%. Her weight was about 167 pounds. The urine never showed more than a faint trace of albumen, no casts, and very few pus cells. She had marked edema and some epigastric distress. She left the hospital after two weeks' time. Fetal heart tones were not audible when she left. Her condition while in the hospital improved. She returned to the hospital four days later and was delivered of a macerated fetus. She left the hospital in a good condition on June 23, 1921.

She was again seen on September 9, 1921, at which time her general health was good. At this time her blood pressure was 140/94. In November, 1921, at which time I again saw her, she was feeling quite well. She had noticed some puffiness of the hands. At this time her blood

pressure was 150/90. In November, 1922, her blood pressure reading was 152/98.

Case X. Mrs. E. M. L. Age: 31 years. The patient was first seen on April 14, 1914. She had had measles and was subject to tonsillitis. A diagnosis of pregnancy and exophthalmic goitre was made. This was the first pregnancy. There was no edema, headaches, or blurring. She was seen again on May 12, 1914. At this time there was some shortness of breath, but no headaches or edema. She was again seen on June 15, 1914. At this time there had been some headache the last few days, but no edema or visual disturbance. In August she began to have some dizziness and blurring of vision, but no headaches or edema. In September she had some swelling of the feet, but none of the face. There was some blurring of vision the latter part of the month, and some epigastric distress. Albuminuria appeared about the beginning of the eighth month, shortly before delivery. She was delivered on October 12, 1914, of a premature infant, precipitately. She had some trouble with her stomach after the birth of the baby.

She was seen again on May 20, 1920. At this time the blood pressure was 158/98-100. On March 8, 1922, she was again seen, at which time a diagnosis of Bartholinian cyst, cystic ovary, hypertension, and goitre was made. The blood pressure reading was 164/108. She was seen again February 27, 1923, at which time the blood pressure was

three months pregnant. She had had typhoid, pneumonia, scarlet fever, tonsillitis, and attacks of upper abdominal colic with jaundice. She had had high blood pressure for over a year. She also had severe headaches. A diagnosis of pregnancy and arterial hypertension was made at that time. About three months later she developed intense head-

## HYPERTENSION DURING PREGNANCY

Case of Mrs. E.M.L.

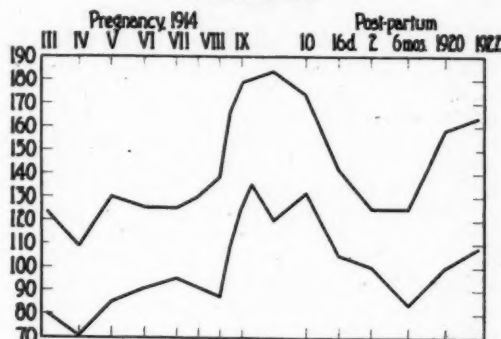


Fig. X, Case X. Graph of blood pressure readings.

ache, vomiting, puffed facies, marked hypertension, and blurring of vision. On the first of August she had intense headache and vomited some. Her face appeared somewhat puffed, although there was no definite edema. Labor was induced on the fifth of August and she was delivered of a macerated fetus.

When the patient was first seen the urine was negative. On July 31, 1916, there was a four plus albumen, which fell to two plus on September 28, 1916.

She was again seen in 1917 when about two months pregnant. She was delivered about five months later of a male child. With this pregnancy she developed albuminuria, some headache, but no edema or visual disturbance. There was marked hypertension. Subsequent to this pregnancy she had functional kidney tests which were normal. She

## HYPERTENSION DURING PREGNANCY

### Case of Mrs. J.B.

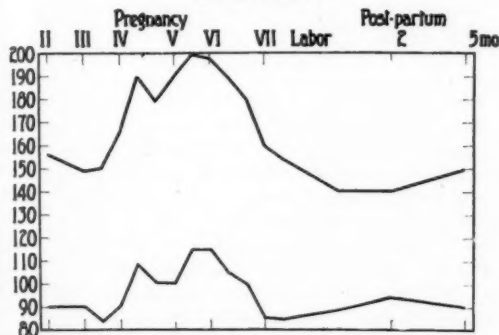


Fig. IX, Case IX. Graph of blood pressure readings.

136-138/102. On March 9, 1923, she was operated and the cyst removed. She made an uneventful recovery and was discharged from the hospital in good condition.

*Case XI.* Mrs. E. A. C. Age: 25 years. She was first seen on September 30, 1921, at which time she was about  $3\frac{1}{2}$  months pregnant. This was the first pregnancy. She had only a faint trace of albumen in the urine. This continued all through pregnancy. She had no edema or headaches. When first seen the blood pressure was 156/80, and about four days before delivery it was 170/110. Labor was induced, and she was delivered of a viable child in March, 1922.

*Case XII.* Mrs. L. M. C. Age: 34 years. She was first seen on April 21, 1916, at which time she was about

## HYPERTENSION DURING PREGNANCY

Case of Mrs EC

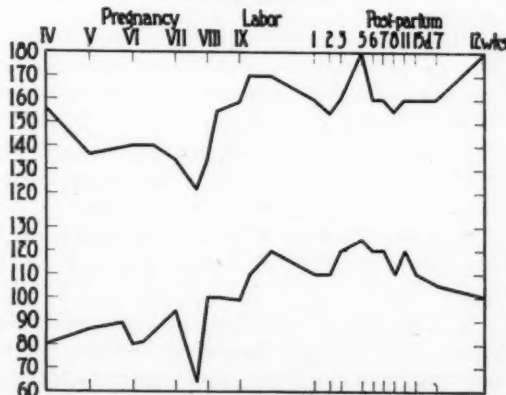


Fig. XI, Case XI. Graph of blood pressure readings.

was at Rochester in November, 1917, at which time the blood pressure was 210/138. She had a two plus albumen, a small number of pus cells. Combined phthalein test was 60% in two hours. There was beginning albuminuric retinitis with a few small hemorrhages in the retina. She was advised the removal of the tonsils.

#### HYPERTENSION DURING PREGNANCY Case of Mrs. L.M.C.

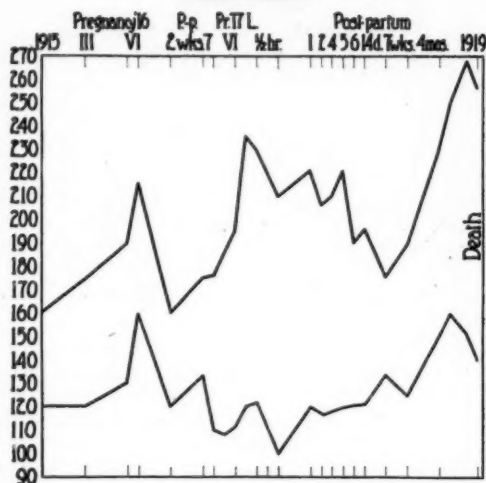


Fig. XII, Case XII. Graph of blood pressure readings.

In October, 1919, Dr. H. L. Ulrich found the blood chemistry to be practically normal. P. S. P. was 48%. The Mosenthal Diet: Day urine, 914 c.c. sp. gr. 1010-1020. Night urine, 690 c.c. sp. gr. 1014. She became much worse in November and entered the hospital in a uremic condition. At this time there were large amounts of albumen and many casts. A urea nitrogen of 82, uric acid 15, creatinin 2.5, blood sugar .33. She was nauseated, vomited, had convulsions, and marked nervousness. Her blood pressure reading at this time was 268/152. She died in November, and partial autopsy showed an arterio-sclerotic kidney.

#### SUMMARY

1. The routine taking of blood pressure readings is very important in the detection and diagnosis of pathologic conditions, especially eclamptic toxemia, during pregnancy.
2. An increase of blood pressure during pregnancy practically always means the existence and progression of some pathologic condition.
3. The presence of a hypertension during pregnancy is not in itself necessarily a serious condition.
4. The causes underlying a hypertension in pregnancy are usually important and are apt to become aggravated during the pregnancy and with each subsequent pregnancy.

5. There are several groups of cases which present hypertension during pregnancy.

6. Eclamptic hypertension is one group which is characterized by an acute hypertension usually followed by a drop to the normal level following confinement.

7. As above, but followed by a persistent though lessened hypertension.

8. An already existent hypertension which does not increase during pregnancy. This form is unusual and makes a second main group.

9. A third main group with an existent hypertension which increases during pregnancy due to the aggravation of the underlying condition, probably a nephritis. These cases are apt to become progressively worse with each successive pregnancy. In some the blood pressure recedes to its usual level, and in others it remains higher subsequent to delivery.

10. The fourth group might include those cases which have an antecedent hypertension upon which an eclamptic toxemia is superimposed. In these cases the preexisting condition may or may not be aggravated by an eclamptic toxemia. In the former instance the blood pressure remains persistently higher as a rule, and in the latter it resumes its usual level.

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#### DISCUSSION

DR. E. L. GARDNER: Dr. Adair has presented a very interesting and comprehensive paper. Hypertension in pregnancy is one obstetrical subject which is of particular interest to the internist. Dr. Adair has called your attention to the differential diagnosis, some points of which might be stressed.

Eclamptic hypertension is a clinical entity, characterized in the early stages by a more or less variable syndrome



but later very often by a high blood pressure, albumen and casts in the urine and a tendency to edema. Usually there is little or no blood in the urine. The kidney in this case resembles very closely the kidney as seen in cer-

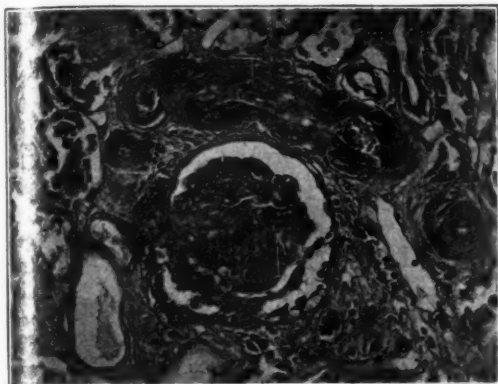


Fig. XIII. Case XII. Photomicrograph showing the characteristic changes in an arterio-sclerotic kidney.

tain degenerations, such as those which follow intoxications, following fevers, mineral poisons, and so on, a condition which we very frequently call a nephrosis to differentiate it from inflammatory changes in the kidney,—inflammatory nephritis. Following labor and the puerperal period or removal of the intoxication, recovery of the kidneys is apparently complete. Possibly a few of these kidneys show some permanent damage, a supposition which is hard to prove.

We may have eclamptic hypertension associated with physical injury, especially glomerular injury. In such cases we are likely to have the eclamptic symptoms increased. Usually there are also some additional symptoms, namely, nitrogen retention, and a tendency to fixation of the specific gravity of the urine. These cases are likely to have a severe albuminuric retinitis and often show a considerable quantity of blood in the urine. After labor the eclamptic symptoms may disappear. However, we always have a residue which is aggravated over what it was before pregnancy or the most we can expect is a return of the kidneys to the condition which was present before pregnancy developed. Acute nephritis developing in pregnancy probably does not clear up entirely; there is nearly always some residue, or scarring, which, however, may not be evident clinically.

My third point is that hypertension (so-called essential hypertension) may be associated with eclampsia. Essential hypertension per se, of course, is not a cause of edema and makes a differential point. However, when the two are associated together the differential diagnosis is more difficult. The symptoms of eclampsia are likely to be increased if renal arterio-sclerosis is present. Such cases have a high blood pressure before and following eclampsia. On the other hand, as Dr. Adair has shown, hypertension cases may go clear through pregnancy without any evidences of eclampsia.

Eclamptic hypertension, glomerulonephritis and essential hypertension may therefore occur in pregnancy and one may occur in association with another. The prognosis depends upon how thoroughly the cases are analyzed and also to a certain extent upon the treatment instituted. We should therefore be very careful not to draw conclusions from insufficient data, that is, just hypertension and albumen.

DR. A. G. SCHULZE: I had the pleasure of reading Doctor Adair's paper yesterday and I made some notes on that part of the paper which he did not read this morning. If I were obliged to follow a woman through pregnancy and resort to blood pressure findings on the one hand or be obliged to resort to urinalysis on the other hand, I think I should take the blood pressure method. It has been found that in those women who show a "trace" of albumen, forty-five per cent develop toxemic symptoms, and in another series of pregnant women who developed what you would call a "large trace" of albumen only fifteen per cent developed toxemic symptoms. Therefore the amount of albumen in the urine seems to be very unreliable as an indication of eclampsia; the blood pressure reading being much better.

What is a normal blood pressure in pregnancy? I am asked that question repeatedly and I tell the patient that there is no such thing as a normal blood pressure, except in so far as you apply it to the patient at the time you take it and under the conditions and circumstances in which you take it. Three years ago, in preparing a paper for the Ramsey County Society on this question of blood pressure during pregnancy I analyzed 210 blood pressure readings taken in 50 women who were pregnant from the fourth to the ninth month, and I found that the average of these readings was 117 millimeters of mercury, which is a little below the generally accepted 120, and that they ranged from 109.5 at four months to exactly 119.5 at nine months, an elevation of ten millimeters of mercury during pregnancy. At no time, from one month to the next, was there a greater increase than three millimeters of mercury over the preceding month.

I also had 75 blood pressure readings taken at the end of pregnancy and before the patient went into labor and the average of those was 123. I had a series of 86 blood pressure readings that were taken, as near as we could determine, in the second stage of labor, and they averaged 133. I had 104 readings that were taken three hours after delivery and found that it had gone back to 120. If a pregnant woman comes to you for the first time and she has a pressure reading of 130 or 135, what does it mean? It does not mean anything in itself because her blood pressure reading before she became pregnant or before you saw her, may have been 150 and now it has come down to 130. It may be that she has been carrying a blood pressure of 130 all her life; or it may have been that earlier in pregnancy her blood pressure reading was 100, 105 or 120. It makes all the difference in the world which way the blood pressure is going, whether it is going up or going down or holding its own.

A few years ago Irving of Boston showed that if the blood pressure remains between 130 and 140 about 3 per

cent of the women would develop toxemic symptoms; if the blood pressure went between 140 and 150, 9 per cent of them developed it; if it went between 150 and 160, 25 per cent developed it; if it went between 160 and 170, 50 per cent of them developed it, and when it reached 180, 100 per cent of them developed it.

The value of blood pressure readings is not in a single individual reading but rather in a series of readings. I take blood pressure readings every time I see my patient as faithfully and systematically as I do urinalysis, and the danger in pregnancy is when it begins to go up. It has been said that if the blood pressure reaches 150 you are getting beyond a normal pregnancy.

The essayist in his paper made some remarks about a postpartum eclampsia being less severe. I used to think so, and yet some of the most severe cases of eclampsia with convulsions have all been postpartum, and I am beginning to doubt whether a postpartum eclampsia is necessarily a simple form. The essayist also said something about a double toxemia developing. I am glad that he mentioned it.

He mentioned a case of fetal death without convulsions. I would like to ask if that fact established the diagnosis of chronic nephritis. Another question I would like to ask is, are convulsions characteristic and diagnostic of eclampsia as opposed to a chronic nephritic condition. The internist brought that point out some time ago and I have been trying to observe it from the point of view of the obstetrician. Another question is the differential diagnosis between eclampsia and chronic nephritis.

DR. ARCHIBALD McDONALD: I have enjoyed reading Dr. Adair's paper, which brings out forcibly the value of the simple procedure of diagnosis. The classification of the convulsive toxemias of pregnancy is not simple, neither is it absolutely definite. We must admit two, if not three, types. First, the exacerbation of a pre-existing chronic nephritis; second, the onset of an acute condition occurring either as an infectious condition, or as the so-called kidney of pregnancy. For both of these types elevation of blood pressure, together with other signs of nephritis, will give ample warning at a time when proper treatment will usually prevent an onset of uremic convulsions.

There is a third type, which I think of as eclampsia. Its etiology is not known, but its occurrence as an entity must be admitted. It may occur in women who have no edema, no albuminuria, and often no marked elevation of blood pressure. The condition frequently clears up with no evidence of permanent kidney lesion and, unlike the nephritic toxemias, does not tend to recur in subsequent pregnancies. It seems to depend upon some temporary disturbance, associated with that particular pregnancy. Possibly a recent attempt to prove an anaphylactic reaction of the mother to the fetal blood, which is assumed to be absorbed through abnormal placenta, may throw important light upon the etiology.

I believe that the premonitory signs, commonly described as pre-eclamptic, are really of more help and value in conditions with the uremic type of convulsion, that true eclamptic convulsions may occur equally often in the

nephritic. In fact, the nephritic changes may and do predispose to true eclamptic convulsions, but there is a distinct type of eclampsia for which we must hope that future work will develop characteristic preconvulsive evidence.

DR. F. J. HIRSCHBOECK: There has always been a great deal of confusion among clinicians regarding the terminology relative to convulsions in nephritis and so called "eclamptic" convulsions. One of the speakers has referred to the three types of hypertension associated with pregnancy: the eclamptic hypertension, essential hypertension and renal hypertension. The differentiation is not as difficult as it may seem. Essential hypertension is relatively rare in women in the child-bearing period, and usually does not develop until the menopause, so that in a pregnant woman with hypertension a diagnosis of primary cardiovascular disease must be made with caution.

I believe the term "eclampsia" is not used as often as it should be used, and in fact it is possible that the convulsions occurring even in renal insufficiency and uremia are eclamptic manifestations and not an evidence of non-protein nitrogen retention.

The true eclamptic has a rather characteristic appearance: his face is florid during the convulsion, usually cyanotic, and in appearance appears to be relatively well before the attack. Chemical studies before the convulsion usually show no increase, or only a very slight increase, in the end products of protein digestion in the blood, and the blood picture, from the standpoint of its individual cellular constituents and hemoglobin, is normal. On the contrary, a patient who is uremic, and who has symptoms of renal insufficiency, is pale, anemic, and looks ill. The blood count is materially reduced, and the blood chemical studies show an increase in the end products of protein digestion. The true uremic does not have convulsions very often, even in the terminal stage, which is characterized more by a twitching of the extremities and muscles, with a gradual deepening coma, and rarely convulsions. The prognosis in eclamptic convulsions is good, if there is no disturbance to a marked degree in the renal function, and is benefited by spinal puncture or venesection, which would have no influence, or which might result in a deleterious effect, in a true nephritis.

DR. J. C. LITZENBERG: In two or three of Doctor Adair's cases he illustrated the significance of blood pressure after the delivery. Something of a drop is the usual occurrence and then a rise to either the height it was before or approaching it. Then a gradual drop or a rapid drop after delivery, and it is of that I wish to speak as indicating something of prognosis. There seems to be some evidence that we can get an inkling of what the ultimate prognosis of the case may be by the rapidity with which the blood pressure drops after delivery.

It is the usual thing in a case with a good prognosis for the blood pressure to drop fairly rapidly in a comparatively short time to a normal reading. There are on the other hand cases in which the blood pressure drops very slowly. It may be considerable of an assumption to say that these are cases in which the kidney injury has been greater than those in which the drop has been more rapid, but I

believe it to be true. It is a blood pressure condition of this kind in which there is always a residue in the kidney referred to by Dr. Gardner. I take it that he meant residue of injury.

As Doctor Bell of the Department of Pathology at the University has emphasized many times, the human kidney has much more tissue than is necessary to sustain life. Therefore, even if the kidney be injured there may be enough normal kidney tissue left for the woman to go on with normal findings. Yet those women, if they become pregnant again, sometimes repeat this hypertension story. Kidney injury in toxemia of pregnancy is a mighty interesting subject to me, I wish we could know more about it. I am convinced through my experience in the last few years that there are some of those kidneys that are permanently injured.

I had one case of eclampsia that I had the privilege of following for twelve years. She had eclampsia in her first pregnancy. Her blood pressure returned to normal very, very slowly; it took many weeks. She also had a moderate albuminuria for those many weeks. She finally returned to normal, remained so for nearly twelve years, that is, normal urinary findings. She became pregnant twelve years after the first pregnancy. She went through the second pregnancy apparently normal for seven months, then she had a beginning hypertension but no albumen until she had had the moderate hypertension for several weeks. Then all of a sudden, in the ninth month of pregnancy, she had a rapid rise of blood pressure which made it necessary to induce labor.

My guess in this case was that her kidneys were badly injured and there was enough normal kidney tissue left for apparently normal function. She was in good health, there was no abnormal urinary findings and even with the subsequently pregnancy the kidney was able to function normally until the burden began to be too heavy, then there was not enough tissue to carry on. This is only an assumption, but I think it indicates the prognosis.

I want to speak about the fallacy of average blood pres-

sure readings. A few years ago I made an analysis of the blood pressure readings of 526 cases and I came to the same conclusion that Dr. Schulze came to, namely, that there was a normal rise in blood pressure during pregnancy, that was by averaging my readings. It occurred to me that perhaps I had better analyze what occurred in the individual cases. So I took the average blood pressure readings of each case and I averaged them and I found that there was no rise of blood pressure during the normal pregnancy, although that had always been my impression and my figures seemed to prove it. Of course, I dealt with only 526 cases. That is not very many. There seemed not to be a rise in blood pressure, although I admit it is hard for me to get away from the impression that there is.

DR. F. L. ADAIR (closing): In answer to the questions regarding the fatal case, I would say that the patient was made worse with each succeeding pregnancy, and further injury was added to the lesion she had before. The cause of death in this case was the result of uremia which resulted from the arterio-sclerotic kidney.

Are convulsions peculiar to eclampsias? I don't think they are, but Dr. Hirschboeck has covered the differential diagnosis between uremia and eclampsia and I will not go further into that question. Of course, we have other findings than hypertension which establish a diagnosis of eclampsia. We occasionally run across an epileptic, and it is not unusual to have a case of hystero-epilepsy. I think we should usually be able to differentiate between uremia and eclampsia by the patient's urinary findings and blood chemistry, if you wish to go into it. I think a fairly good way to differentiate a uremic case from an eclamptic condition is one I think every one could apply. First, a careful history; second, physical examination for evidence of chronic renal disease; third, urinary examination—albumin with casts and cytologic elements in the nephritic, and little except albuminuria in eclampsias; fourth, the rapidly developing clinical course of eclampsia. These things should lead one to a correct diagnosis in most cases where more elaborate diagnostic measures are not available.

### TOO MANY COUNTY SOCIETIES SLEEPING

Too many of our county societies are sleeping, arousing just enough at necessary intervals to keep their names on the books. The council is held responsible for them under the constitution and by-laws of the state association. It is hard to believe that the councils in some instances realize their responsibility. Perfunctory reports made at some annual meetings indicate that they do not. Councilors' reports made up from letters sent out the week before the annual meeting of the state association are not reports—they are evasions. Councilors are supposed to visit—actually visit—the societies in their respective districts at least once each year. How many do so? Councilors are supposed to "inquire into the condition of the profession," to "organize component societies where none exist," to be "peace makers and censors," to "improve the zeal" of county societies. These things cannot be done by writing a few letters ten days before the annual meeting and then turning in what

purports to be a report, which, formulated in that manner, nearly always makes it appear that everybody is happy and that medical organization is 100 per cent efficient, when, as a matter of fact, the formality of a funeral is about all that is necessary, in some instances, to carry out the very distinct indications as presented by the situation that really exists.

Within thirty days, the organization of five independent local medical societies has been reported in territory already occupied by county medical societies supposed to be alive and going. What's the matter? Why are the societies already in existence not meeting the needs of their members? Why do they find it necessary or desirable to go off and form new and independent societies? Those things are for the councilors in the respective districts to find out. And it is their duty to try to remedy any condition in the county societies concerned that is responsible for these undesirable situations.—A. M. A. Bulletin, Dec., 1923.

## METASTASIS IN BREAST CANCER\*

W. A. COVENTRY, M.D., F.A.C.S.

The Duluth Clinic

Duluth

The object in bringing this subject before you today is to review with you several outstanding features that have been revealed by the study of some thirty-six cases of breast cancer that have been operated by us and in which the "follow up" has been completed.

The question of metastases in their relation to the prognosis, has been an interesting study.

The chief avenues of metastases in breast cancer are: (1) axillary glands; (2) to the clavicular chain of glands; (3) through the chest wall to the mediastinum; (4) to the peritoneal cavity; (5) local recurrences in the skin; (6) bony or skeletal metastasis.

The question must also be considered from the proper preoperative, operative and postoperative standpoints.

*Axillary Involvement.*—Our series show that 89 per cent had axillary involvement previous to operation. This percentage is about the same as that reported in other series of cases in the literature.

The presence of axillary involvement has not deterred us from advising operation, but especially indicates the desirability of preoperative roentgen therapy in this area. The operation has always included the removal of the glands and the gland bearing tissue about the vessels in the axilla.

Postoperatively 80 per cent of these cases have had intensive roentgen therapy, and in the cases operated 70 per cent have shown no evidence of recurrence of the axilla involvement. The other 30 per cent, however, did recur in the axilla. This very small number of recurrences in our opinion speaks very well for the effect of roentgen-ray therapy to the more superficial gland bearing areas.

*Cases With Metastasis Into the Clavicular Group of Glands, Either Subclavicular or Supraclavicular.*—This type has not been as numerous as the axillary type, primary metastases being noted in only 11 per cent of the cases. Recurrence in these cases has taken place in only 0.5 per cent.

It is our practice to first treat these cases with intensive roentgen-ray therapy before operation,

and then at the time of operation to remove all the glands and gland bearing areas up to and under the clavicle.

However, it does seem that the glands are better controlled by roentgen-ray therapy in the supraclavicular group than in the axillary group. This may be due to the fact that they are more superficial than the axillary group of glands.

Radium, in the treatment of this supraclavicular type of glands, has not been tried.

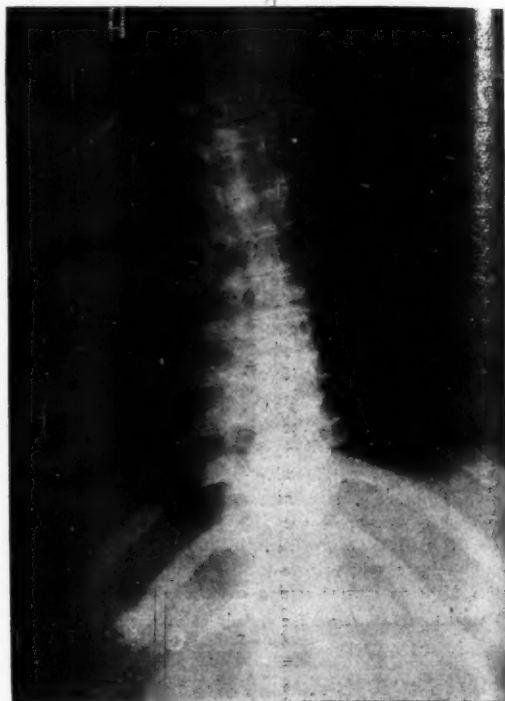


Fig. 1. Case 27120. Operated Oct. 22, 1921. July 18, 1922, shows Ca. Metastasis sixth dorsal vertebra.

*Metastasis Through the Chest Wall to the Mediastinum.*—Metastasis through the chest wall, to the mediastinum, in to the pleura, involving the lung, and extending to the opposite breast, has occurred in a number of cases. There were six cases that died from lung involvement. However, three of these cases died from a general carcinomatosis, and in these cases one must consider as to whether the metastasis was primarily through the chest wall or whether it was due to malignant emboli or metastasis from some other source. There have been no cases of malignant involvement of the pleura.

Metastasis to the opposite breast has occurred in

\*Presented at the annual meeting of the Minnesota State Medical Association, St. Paul, October, 1923.



0.8 per cent of the cases, the metastasis always occurring late.

One must also consider whether in these cases we have to deal with a new malignancy occurring in the opposite breast or to metastasis from the primary growth.

This type of metastasis also offers very satisfactory results with roentgen-ray therapy.

*Recurrences to the Abdominal Cavity.*—Recurrences to the abdominal cavity through the lymphatics has not been observed in our series, and a review of all the available literature reveals the fact that such avenues are possible, but it is more likely that liver metastasis is secondary to metastasis from bone or lung carcinoma.

*Local Recurrences in the Skin Over the Amputated Area.*—These have only occurred in 2.8 per cent of cases. This, we think, is a very good record, and believe it is due to three reasons: (1) Preoperative roentgen-ray therapy; (2) a wide dissection of the breast; (3) systematic postoperative roentgen-ray therapy.

*Skeletal Metastasis.*—Metastasis into the bone offers a very interesting study. Our series showed 0.25 per cent of those operated developed a bone metastasis.

Whether or not those cases had some metastasis before operation we do not know because this was

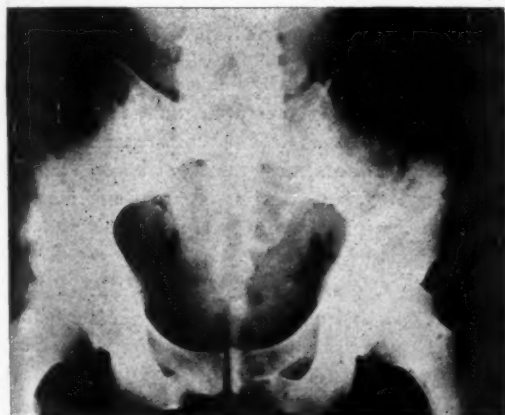


Fig. 2. Case 33611. Operated May 19, 1923. Picture Oct. 1, 1923, shows metastases left head of femur and beginning ilium.

not investigated before operation in any of the cases.

Metastasis occurs in the order of frequency in the head of the femur, the ilium, spine, sternum, ribs, skull and lower jaw.



Fig. 3. Case 26918. Operated Sept. 27, 1921. Picture Aug. 1, 1922, shows extensive metastasis of spine with marked deformity.

The elbow and the knee joint, and all of that part of the skeleton below the head of the femur, seem to escape metastasis.

Skeletal metastasis seems to become very well established before any symptoms arise, the only symptom being that of pain, which is very severe. The unfortunate point here is that although roentgen-ray therapy will to a certain extent relieve the pain, it seems to have, in our experience, no decided beneficial effect upon the process once it has become established.

The roentgen plates in these cases deserve very careful study, and are best compared with the normal in order to bring out the rarefaction of the bone.

Metastasis undoubtedly occurs by way of the lymph channels, although some authors suggest that it may come through the blood stream.

Kauffman, in his article on metastasis, finds that 52 per cent of those dead from carcinoma have skeletal metastasis.

It is my belief that this type of metastasis is more frequent than is generally supposed, and that

roentgen pictures of the head of the femur, the ilium and the spine should be taken in all cases of carcinoma of the breast before operation. It has been repeatedly demonstrated that local and glandular infection can be controlled and cured by the use of the roentgen ray. It has also been shown that once the metastasis reaches the bones the roentgen ray has practically no effect, except a palliative one.

It is universally agreed that the degree of malignancy in carcinoma is due to the type of cell found in the tumor. Tumor masses showing hyalinization and fibrosis generally speak for longevity, while those cells of a more embryonic type speak for a short life. The unknown quantity of the degree of resistance of the patient also must be taken into consideration. These facts have been very well shown by McCarty and Sistrunk in their very admirable work. It is generally recognized that the size of the tumor in the breast is of no particular prognostic value, but the involvement of palpable glands, with fixation, decreases the chances more than one-half for a favorable outcome.



Fig. 4. Case 12660. Operated Sept. 1, 1922. Picture Apr. 10, 1923, shows beginning carcinomatous involvement vertebrae. Now has metastasis to ilium and femur.

It is also recognized that cancer, appearing after fifty years of age, is more favorable as to prognosis than that occurring before fifty, and that the younger the individual the more increased is the cell activity, and the more rapid the demise.

It is our opinion, gathered from these statistics, that it is much better to give the patient the benefit of the doubt and remove all fibromas, cystic mastitis and so-called "lumps" in the breast, this being a much safer procedure than to allow them to remain until such time as carcinoma develops

and metastasis has taken place, when the hopes of an ultimate recovery are certainly not good.

We believe, in view of the fact that skeletal metastasis is so common, and that when once found



Fig. 5. Case 29128. Operated Nov. 28, 1922. Picture Aug. 22, 1923, shows extensive metastasis ca. in femur.

the prognosis is hopeless, that it is better practice in all cases of breast carcinoma to take roentgen pictures of the ilium, head of the femur and the spine, so as to determine before operation whether there is any metastasis in these bones. If metastasis is found it would be very much better to refuse operation and attempt to treat with the roentgen ray, feeling sure that the ultimate outcome will be as favorable, and life will probably be increased by such a procedure.

We are also of the opinion that roentgen-ray therapy, from seven to ten days before operation, and then intensive system roentgen-ray therapy, giving about 130 per cent of the maximum skin dose over the local area, the glands, and also skeletal bones involved, is, in the line of our present knowledge, the best procedure we have for the treatment of carcinoma of the breast.

Lee reports that the length of life after recurrence was six and one-half months without irradiation, but after postoperative irradiation it jumped to two years and four months.

Radium has not been used because we believed that better penetration could be obtained with roentgen ray.

**Conclusions.**—1. Metastasis into the skin, axillary glands, supraclavicular region, and in the chest wall, is unfavorable, but the condition can be controlled or arrested by the intelligent use of roentgen-ray therapy.

2. Carcinoma of the opposite breast does not necessarily mean a metastatic involvement.

3. Metastasis into the skeletal structures, more particularly the ilium, the head of the femur and the spine, offers an exceedingly painful course and unfavorable prognosis. The pain, however, may be controlled to some extent by the roentgen ray.

We think it better practice to take roentgen ray pictures of the femur, the ilium, and the spine, before operative measures are instituted, and if rarefaction is found it would be much better to refuse operation in these cases.

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Fig. 6. Case 27120. Operated Sept. 22, 1921. Picture Dec. 18, 1922, shows metastasis ca. into ilium.

#### DISCUSSION

Dr. W. E. SISTRUNK, Rochester: I was very much interested in listening to Dr. Coventry's paper, and I think he has brought out some very interesting and important facts. It has been customary with us for a good many years to take x-ray pictures of the lung and chest preliminary to operations for cancer of the breast, but up to the present time we have never made a routine habit of taking x-ray pictures of the bones. We have felt that the first symptoms of bone metastasis which would be recognized as being symptoms were symptoms of pain. It seemed as though

we very rarely were able to find involvement in bones without having some history of preliminary pain. In fact, I am able to recall one or two patients in whom we suspected possible bone metastasis, in whom the x-ray plates were

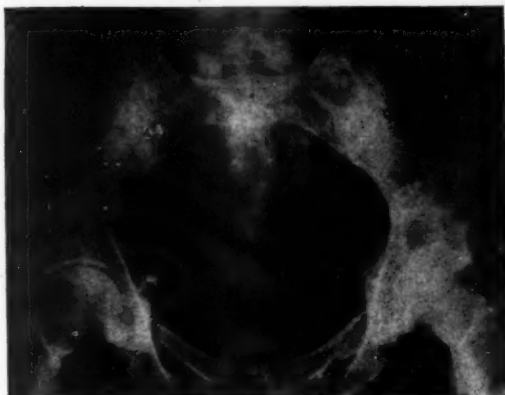


Fig. 7. Case 6046. Operated June 9, 1921. Picture Aug. 5, 1922, shows metastasis to ilium.

negative and who later continued to have symptoms and finally showed positive plates. But I think that the doctor's suggestion that the bones which seem most commonly involved be given roentgen-ray examinations—and especially in cases where glandular involvement is present—is certainly a very good one, and we all ought to bear it in mind.

I recently had an opportunity to review the histories of ninety-seven patients in whom we felt that we had fairly accurate data in regard to the points at which recurrences had occurred following radical operations of cancer of the breast. In this group a number died from general metastasis, but when we took them as a whole and studied them we found that in forty-seven per cent of the cases there were evidences of recurrence in the skin. Twenty-eight per cent of these had had glandular involvement at the time of the operation, and ten and a half per cent had had no glandular involvement at the time of the operation. Then we found another very interesting point and that was that in sixty and a half per cent of these people who came back with local recurrences we were able to demonstrate recurrences in other portions of the body at the same time.

I think that Dr. Coventry is correct in thinking that metastasis in cancer of the breast occurs very much more frequently in patients who have glandular involvement at the time of the operation. Now the time at which metastasis occurs in glands varies considerably, I think, in different patients. It is not a very uncommon thing to see a patient who has the type of carcinoma which probably has been present for several years or longer without any metastasis that we are able to locate. In these patients the growth is probably surrounded by a tremendous amount of fibroid tissue, and they are able to hold it in check. But in the ordinary patient at some time during the course of the disease metastasis will usually occur. It probably comes, I think, from the breaking down of the carcinoma

which allows a certain fluid to collect in the tumor which is picked up by the lymphatics. I imagine that all lymphatics which drain that region are likely to be affected at that time, and that that accounts for the frequent recurrences following operations for cancer of the breast. It is really appalling to see how advanced the majority of patients are in the disease when they consult you in regard to the trouble.

Recently in a study of two hundred and eighteen patients whom we were able to follow after operations for cancer of the breast, we found that the glands were involved in sixty and a half per cent of the people at the time of operation, and that in this group twenty of these people had ulcerated growths at the time of operation and sixteen had diffused growths which were scattered throughout the entire breast. Now the operations which we do give results which are almost entirely dependent upon the stage of the disease at which we operate. I think it is interesting to note the difference which comes following operative procedures in different stages of the disease. For instance, in going over this series which I have just mentioned, I ran across a small group of six patients who were operated upon for cancer of the breast in which a simple amputation was done. The condition was not recognized at the time of operation but later was found by the pathologist to be a definite cancer but an early type of cancer. But nothing further was ever done. We traced five of these six: Four were alive—66.66 per cent—for five to eight years after operation; one had died four years afterwards but we could not ascertain the cause of death; and another was traced for two years and then we lost track of her. But they were simple amputations and 66.66 per cent were alive with the possibility of another being alive.

Now when we studied the people who had been operated upon when the glands were not involved we found that in eighty-six patients, 64 per cent were alive from five to eight years after operation; but we know that in three of these who were alive recurrences had either been present or were present at the time. We took another group and considered people who had involvement of the glands. We found that of 132 people with involvement of the glands only 19 per cent were alive; and that with twenty people with ulcerated growths 85 per cent were dead in five years; and that with sixteen diffuse growths all were dead within five years.

So I think we ought to bear in mind the importance of operating on these cases early. It behooves us to try to educate the public to have all breast tumors examined early.

DR. C. A. DONALDSON, Minneapolis: It seems to me the important point in the doctor's paper is the question of radiating the bone for diagnosis prior to operation. I was surprised a short time ago, without the presence of pain, to find both femurs very seriously involved in breast carcinoma. There was no pain further than perhaps the first or second lumbar vertebra. This constitutes a very important preparation.

For a long time we have treated with the 125-kilovolt type of machine. We know now that it is impossible to penetrate with a cancer-killing dose more than about three

or four centimeters with such voltage. So if we are going to penetrate deeper we must use stronger apparatus.

On the question of operative work and the metastasis that occurs following it, there is a very interesting discussion by Handley in his second edition, comparing the work of Halstead and Cheyne. He describes Halstead's work as giving a wider dissection of the skin, and Cheyne's work as giving a wider dissection of the deep fascia; and he gives the results in their skin recurrences: Halstead getting sixteen per cent, I believe, and Cheyne six per cent skin recurrences. Doctor Coventry spoke of the wide dissection but he did not say whether it was of skin and fascia both or whether it was the dissection of fascia alone.

There are two important considerations that should modify our treatment a good deal. We do know that sufficient radiation kills cancer cells. The difficulty has been to get sufficient radiation to the widespread metastases, and more important is the fact that radiated tissue, when transplanted, does not grow. There is no use sending a neglected case to the roentgenologist when nothing can be done by the surgeon. We might as well recognize that fact. You can do something to modify the course of the disease, and you can give relief from pain; but you might as well send these folks home if they expect to be cured. Now I think those are the important factors.

DR. JAMES A. JOHNSON, Minneapolis: I am very pleased to have heard this splendid paper. Dr. Coventry has very carefully outlined the points of metastasis that occur in breast carcinoma.

There is one point of metastasis that I would like to emphasize and that is to the neck of the femur. Not infrequently a metastatic process in this location is overlooked. I can recall, while in one of the large Chicago Clinics, that I had on my service at one time three cases of pathologic fracture of the neck of the femur, unrecognized as such, due to metastasis from a breast carcinoma. One had been operated for carcinoma of the breast in the same hospital five years previous, with no local return and no evidence of foci in any other place. The other two were in younger individuals and had been treated for an ununited fracture for some time. The primary lesion in the breast had not been recognized—all three had received their fractures from a trivial injury which should have put the clinician on his guard at once.

I agree with Dr. Coventry that preliminary to operation it is essential to x-ray the lung and also the long bones, especially if there is any local bone pain or discomfort. This is especially important in advanced cases.

I also believe a preliminary x-ray treatment is of some value. I think, however, it is a mistake to carry it over a period of months when often much valuable time is lost. The operation should be undertaken shortly after the initial radiation. I believe post-operative radiation is of considerable value and should be continued for several months.

DR. W. A. COVENTRY, Duluth (closing): Only one word: The thing which stimulated me to this study was the fact that three of these cases developed bone metastasis within six months after they were operated. The patients were just getting on their feet and feeling quite happy, and all at once they were condemned to a slow death.



## THE DIAGNOSIS OF ACUTE APPENDICITIS IN CHILDREN\*

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Mayo Clinic, Rochester, Minnesota

My reason for bringing this subject before you today is twofold: first, because there are still too many unnecessary deaths among children with appendicitis, because of failure to make early diagnosis, and second, because it is a subject in which the general practitioner and surgeon are as much interested as the pediatrician.

In our series of fifteen cases under five, only four patients were brought to the surgeon inside of forty-eight hours after onset, and nine had generalized peritonitis (Table 1). It is agreed that if appendicitis can be diagnosed in the first twenty-four hours and the patient promptly operated on, the mortality is practically nil. Furthermore, in no condition is the cure so radical and complete as in cases of appendicitis after the removal of an infected appendix. It is evident, therefore, that all of our efforts should be directed toward early recognition of the condition, which may be accomplished quite successfully in the adult, as is seen by the mortality statistics of most hospitals. In infancy and childhood, the diagnosis is very much more difficult. The insidiousness of onset and the rapidity with which rupture of the appendix occurs make it difficult to get the patient to the surgeon before the infection has spread beyond the confines of the appendix. As Finney has emphasized, in the adult the tendency is to mistake other conditions for appendicitis, whereas in the child the tendency is to mistake appendicitis for some minor condition. Pneumonia is the one great exception to this rule, for not infrequently central pneumonia of the right lower lobe may give symptoms suggestive of appendicitis.

The younger the child, the more difficult the diagnosis of appendicitis, but fortunately also the less likely is the condition to be appendicitis. In a series of 16,571 cases of appendicitis collected by Kelly, only 2 per cent of the patients were under six years. Eight per cent were between six and ten years, and 16 per cent between ten and fifteen. Although the disease is very infrequent in the first

two years of life, the extreme mortality of 50 per cent in Abt's series of eighty cases makes an early recognition of the condition imperative. In most of his cases the diagnosis was not made until the inflammatory process had extended beyond the appendix, and in a number it was made only at necropsy. Our series of fifteen cases in patients under five years emphasizes the same points, the late diagnosis and early peritoneal involvement.

As brought out by these data, no greater responsibility presents itself to the physician than the decision in the case of an obscure abdominal condition. Although appendicitis is easy to diagnose early when it appears in its textbook form, in its atypical manifestation it is likely to tax to the utmost the diagnostic acumen of the physician.

TABLE 1  
APPENDICITIS IN CHILDREN

Duration of illness before admission, hours	Fifteen cases, five years and under	Fifty-three cases between six and fourteen years
24	3	24
36	1	8
48	4	9
60	2	1
72+	5	6*
DEATHS		
Operative	3	3
Non-operative	4	
Appendiceal abscess	5	13
General peritonitis	9	10
Mortality, per cent	47	5.5

\*Five interval operations.

### HISTORY

The younger the child, the less probable, naturally, is the history of previous attacks. Churchman describes the case of an infant with an appendiceal abscess at twenty-seven months, who had had two definite previous attacks. The nature of the attacks is sometimes typical, sometimes, in retrospect only, suspicious of previous appendicitis.

In the group of fifty-three patients, seen during 1921 and 1922, in the Mayo Clinic, about 30 per cent had a history of previous attacks, and in the group of fifteen patients up to five years, only 6 per cent had such a history. In most instances it is a rather indefinite attack of abdominal pain associated with vomiting and slight indigestion. This rapidly passes off. As an exception to this rule, diarrhea of twelve hours' duration, without pain or vomiting and, so far as could be ascer-

\*Read before the meeting of the Minnesota State Medical Association, St. Paul, October 10-12, 1923.

tained, no indiscretion in diet, was the only subjective evidence of two attacks. In the second attack local tenderness over McBurney's point directed attention to the real source of the trouble. At operation a long appendix, firmly adherent in its entire length to the posterior wall of the cecum, was found.

The history is further of importance in eliminating the abdominal prodromes of certain infectious diseases. The onset of measles, typhoid, or rheumatic fever may simulate appendicitis. Finney cites a case in which the day after the removal of a swollen, thickened appendix the child developed measles. In a second case, similar pain in the right iliac fossa cleared up when the measles broke out the following day, and in a third case, in which the patient was not operated on because the symptoms were indefinite and the brother had measles, operation was delayed until after the appendix had ruptured.

The increased frequency of appendicitis after grippe infections, and following an attack of typhoid, or ulceration of the bowel, makes these diseases of importance as possible etiologic factors.

In some cases there was a definite history of a previous appendiceal attack. This raises the question of whether one attack is sufficient indication for removal of the appendix in the interval.

#### SYMPTOMS AND SIGNS

The symptoms that are almost always present are vomiting and pain, but these symptoms are so frequently encountered in childhood at the onset of illnesses such as the acute exanthemas, respiratory infections, indiscretions in diet, and gastroenteritis, that we are prone to consider them lightly. If vomiting persists after the stomach has been emptied, and if pain continues also, it is of great significance. Pain at first is general, referred to the epigastrium, or around the umbilicus. Only later is it referred to the right lower quadrant. According to Bruening, the first pain is caused by excessive contraction in the appendix and cecum, and is referable to the ganglia. The local pain is due to irritation of the peritoneum. Not infrequently the attack may begin with sharp, acute pain in the right lower quadrant, colic-like in character and disappearing for a considerable interval, only to reappear with greater intensity.

In the fifty-three cases there were only two associated with diarrhea and retrocecal position of the appendix, in which the pain was entirely absent,

although there was tenderness on deep pressure. In seven of the fifty-three cases there was no vomiting, and in two others nausea, but no vomiting was noted. In only one case was there neither vomiting nor pain. The character of the pain varies tremendously, from a slight pain that permits a child to go about its play or walk to school, to an acute pain that doubles a boy up suddenly while he is working in the field. Constipation is usually not present, and diarrhea was present in five of my series of cases.

Pain on urination should always suggest the possibility of an irritation due to an inflamed appendix. It occurred in 8 per cent of Porter's cases. It appears too infrequently to be of any great help, and is of importance only in that pyelitis may cause a similar clinical picture, associated, however, with typical urinary findings.

Flexion of the right thigh, coming on acutely, or bending of the trunk toward the affected side is suggestive of appendicitis.

Respiratory symptoms, cough, expiratory grunt, and hyperpnea, are of value in suggesting a possible respiratory cause for pain localized over McBurney's point. The abdominal pain associated with infections of the throat may at times be suggestive of appendicitis.

Tenderness is perhaps the most important sign that can be elicited in the diagnosis of acute appendicitis. When found locally, it is of far greater significance than any other single factor in the diagnosis. It was present in all of the cases examined. It may be absent, however, particularly in young children, when the process has involved the peritoneum and an exudate fills the peritoneal cavity. It may be present for only a short time. One patient whose complete attack lasted only three hours, was seen by a surgeon after that interval, and he could find nothing. Another similar attack followed; with both there were fever, vomiting, pain, and a leukocytosis. An interval operation showed an appendix folded to a right angle and greatly thickened distal to the angle. Occasionally the tenderness may be on the left side, as in cases reported by Schellong and Porter, when the appendix extends into the left lower quadrant behind the bladder.

Rigidity of the muscles of the abdomen is usually found, but may be absent. The greatest difficulty in determination of both tenderness and rigidity is that the little patient, whether through fear,

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crying, or bad temper, holds his abdominal muscles so rigid that palpation is useless. A few moments used in first winning the patient's confidence is frequently the basis of a successful examination. The confidence of the patient is particularly essential for a successful rectal examination. Rarely is it of use under four or five years of age as a means of determining tenderness, but it is helpful in determining infiltration or the presence of a mass. When children over five will co-operate, tenderness on the right side as compared with the left, is one of the most helpful signs in the diagnosis of appendicitis, particularly in the differential diagnosis from pneumonia.

If ether is used for the examination, the patient should be prepared so that he can be operated on immediately, if necessary.

clear cells is very suggestive of appendicitis, especially if the eosinophils are absent.

Local tenderness which later becomes general usually means perforation and generalized peritonitis. A mass in the right lower quadrant in an acute condition is usually an appendiceal abscess, although it may be merely the omentum folded around an inflamed appendix. A mesenteric cyst in the right lower quadrant may give symptoms and signs indistinguishable from those of appendicitis.

#### DIFFERENTIAL DIAGNOSIS

It is to be emphasized again that a differential diagnosis should be based on the history, the symptoms and signs, and a complete, careful examination of the entire patient. In this way only can we avoid operating for appendicitis on patients

TABLE 2  
DIFFERENTIAL DIAGNOSIS

	Pneumonia	Appendicitis
History	Previous cold or cough Chest pain	Exceptionally, grippe Usually none
Abdominal pain	Severe, constant, general	Paroxysmal, less intense, local
Vomiting	14 per cent	70 per cent
Diarrhea	Common	Uncommon
Facies	Appearance of illness. Dilatation of alar nasi	Uncomplicated, not seen
Respiratory symptoms	Shallow abdominal breathing Expiratory grunt Slight dullness? Distant tubular breathing?	Shallow breathing Costal None
Abdominal tenderness	Superficial, severe Diffuse higher in abdomen No worse on deep pressure	Slight or severe More marked on deep pressure Local
Rectal examination	Negative	Tenderness on right side
Röntgen-ray examination of chest	Positive	Negative
Leukocytes	20,000 to 50,000 (uncomplicated)	10,000 to 20,000
Temperature	103° to 105°	99 to 102°

The child's temperature is usually higher than the adult's, ranging between 98.6° and 102°.

The leukocytes are usually definitely increased, the ordinary count ranging between 15,000 and 20,000. Occasionally counts between 20,000 and 30,000 are found, and exceptional counts as high as 40,000 have been noted, even with an acute unruptured appendix. The differential count, particularly a low count, is of the greatest importance. A low leukocyte count without a percentage increase in the polymorphonuclear cells usually excludes acute appendicitis. Eight thousand leukocytes with 85 to 90 per cent of polymorphonu-

who do not have it, and not overlook the condition in patients who need operation. In making a differential diagnosis we have to consider first those conditions outside of the abdominal cavity, namely, infections of the respiratory tract, prodromes of acute infectious diseases, measles, scarlet fever, typhoid fever with local pain and a polymorphonuclear leukocytosis, and osteomyelitis of the femur or ilium. In differentiating it from pneumonia, the following points, as emphasized by Adams and Berger, are to be considered (Table 2).

In the same way patients with pericarditis (Breneman) have been operated on for appendicitis,

'due to referred pain, probably' caused by irritation of the diaphragmatic pleura.

In the prodromal stage of acute infectious fevers and acute tonsillitis, the sudden onset, nausea, vomiting, abdominal pain, and local tenderness make a picture that is difficult to evaluate unless one has a careful history of exposure, and in the case of measles a leukocyte count and the probable presence of Koplik's spots at that stage. In one of three cases, all of which proved to be typhoid, because of local tenderness and polymorphonuclear leukocytosis the appendix was removed.

Osteomyelitis of the ilium may present symptoms that are differentiated from those of appendicitis with difficulty. I recently observed such a case, in which, however, the operation revealed that it was an appendiceal abscess and not a subperiosteal abscess as we had at first suspected. Finney cites a case in detail in which osteomyelitis of the upper femur simulated acute appendicitis, and was not rightly diagnosed until an abscess formed. An acute psoas abscess may give similar difficulty.

In cyclic vomiting the history of previous similar attacks, absence of local tenderness, and normal leukocyte count are usually distinctive. The danger in these cases is that the parents may mistake an acute appendicitis for merely another attack of cyclic vomiting, and call the physician only after the patient has grown progressively worse as a result of a ruptured appendix.

Conditions within the abdominal cavity that are likely to come into consideration are gastro-intestinal colic, mesenteric lymphadenitis (Brenneman), cysts of the mesentery, and intussusception of Meckel's diverticulum. Inflammation of Meckel's diverticulum may give a picture of appendicitis, but more frequently the case resembles intestinal obstruction due to volvulus.

Mesenteric lymphadenitis is described by Brenneman as giving a clinical picture identical with that of appendicitis. Lee reports two cases in which operation was performed, and enlarged glands found instead of the expected appendicitis. Cysts of the mesentery may cause acute attacks of pain localizing in the right lower quadrant with tenderness and a mass. In the case seen the pain was extremely severe, but usually lasted only a short time.

Attacks of colic are common in infants, particularly when too frequently fed. In older children there is usually some indiscretion in diet which ac-

counts for the pain. The attacks are paroxysmal and usually relieved by pressure. Between attacks of pain there is no local nor general tenderness, no fever, and if a leukocytosis is present, it is generally lymphatic in character.

Intussusception is commonest when appendicitis is rarest, that is, in the first two years of life. The sudden onset with periodic attacks of pain, absence of fever, constipation, bloody mucus from bowels, tumor, and no local tenderness make a characteristic picture, that is not likely to be confounded with appendicitis except late, when the invaginated bowel might suggest an appendiceal abscess.

#### CONCLUSIONS

1. Every acute abdominal condition in childhood should be considered appendicitis until it has been proved otherwise.
2. Acute appendicitis in infancy and childhood owes its peculiarity to the insidiousness of onset and its tendency to rapid perforation. Early diagnosis, therefore, is essential to a reduction of the mortality.
3. The dangers of appendicitis in children should be explained to parents, so as to make surgical aid available at a time when life can be saved.
4. The indiscriminate giving of cathartics to children with abdominal symptoms is an unwarranted and often dangerous procedure. Physicians should instruct parents as to this danger.

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## DISCUSSION

Dr. FREDERICK C. RODDA, Minneapolis: Our present conception of appendicitis is that it begins as an infection of the mucosa and probably in most cases is hematogenous in origin. Dr. Helmholtz has said it frequently follows infection that swings around to various parts of the body. However, I would call to your attention some work done by Rhindorf, during the last two years, in which he has found the ascaris in the appendix at the time of operation. He contends that the worm produces toxic substances which injure the mucosa, and is a determinative factor in the inflammation. Just how important this is, I do not know. We have given up the idea that worms cause any particular trouble,—we may have to revise our opinion.

In the differential diagnosis, Dr. Helmholtz did not stress pyelitis. I think an acute pyelonephritis, especially if it involves the right kidney, is liable to produce symptoms which simulate appendicitis. It is to be ruled out by urinalysis. The differential diagnosis of pneumonia and appendicitis is extremely difficult. If one suspects appendicitis, it is dangerous to delay for developments. The only sure means of differentiation is the fluoroscope or x-ray plate.

We have been impressed, in the last few years, with the frequency with which large mesenteric and retroperitoneal glands are found with an appendicitis. Dr. Helmholtz has mentioned this, and it has also been emphasized by Brenne- man and Hudson. They are frequently found in groups, some of them as large as beans. We have obtained negative tuberculin reactions in these cases. They are evidently not tuberculous. Sections of some of these glands show a simple hyperplasia. Whether they are secondary to the appendicitis or arise from some independent source, we do not know. Brenne- man, however, thinks at times they are the source of pain, and must be differentiated from acute appendicitis.

I should like to remark about the interpretation of the white blood count in cases of appendicitis. It is a fact that the white blood count in children is not as reliable as in the adult. At times the white blood count will be of very little help. I have in mind a little patient who had a white count of 10,000. The surgeon was inclined to think because of the low count that there was no pus present. At the time of the operation, however, a pocket of pus was found. He was then of the opinion that recovery was questionable because of the low count, and interpreting it as low resistance. However, the child made a speedy, uncomplicated recovery. I would feel that the history, physical findings and the exclusion of other conditions are the most valuable. I would put the white blood count at the bottom of the list of helpful findings in the diagnosis of appendicitis.

Dr. E. S. Judd, Rochester: Dr. Helmholtz asked me to discuss this paper for one or two reasons: he knows that I have had a good deal of difficulty in diagnosing appendicitis in children; possibly the other is that I have operated upon some of the cases that he has presented. I do not know of any problem that is more difficult than the diagnosis of acute appendicitis in children, at the first attack. There are so many other conditions that must be

considered. As I think over the cases I have seen, I recall pneumonia as a frequent complication, or a condition which must be ruled out if possible before a diagnosis is definitely made. We have had cases under observation for several hours endeavoring to make a differential diagnosis between an acute appendicitis and beginning pneumonia. I have afterward operated on these same cases. In some instances where we decided that the condition must be due to acute appendicitis, we found very little wrong with the appendix, but the child afterward developed a frank pneumonia. Undoubtedly they had a pneumonia from the start. On the other hand, a number of these children complaining similarly did have acute appendicitis but also developed pneumonia afterward. It seems to me that they must have had more or less of a general infection, appendicitis, and the chest condition at the same time. Then again, I have operated on a few expecting to find appendicitis (though I was not sure whether the condition was pneumonia or acute appendicitis), and found that these children had acute appendicitis, but this group never developed any chest symptoms or any evidence of pneumonia afterward.

I do not know whether there is any way of making an absolute differentiation between an acute appendicitis in a child in its first attack and the beginning of pneumonia. I think most of them must have an abdominal infection and a lung infection at the same time. Of course, we do not like to operate on a child with pneumonia, but the risk of permitting the condition to develop into suppurative appendicitis and peritonitis, we all know, and Dr. Helmholtz' figures show the danger of that.

A point regarding the surgical aspect of this condition. It seems to me that the infections in children are more virulent than in adults. Ordinarily, we feel that it is safe to wait forty-eight hours in adult cases and at operation still expect to find the trouble confined to the appendix, but I have seen a great many children where the appendix has ruptured in twenty-four hours. With adults, we have adopted to a large extent the treatment suggested by Ochsner, thus assisting the patient to wall off the infection with the idea of later establishing drainage, and making an appendectomy. I believe that we should operate on cases of acute appendicitis in children at the end of the second day, even if we feel that the appendix has ruptured. The peritonitis may not be diffuse. I feel sure that our results would justify this procedure.

Another question that Dr. Helmholtz brought up in his paper, interested me: should the child be operated on after having had only one attack? I think we should operate, if the diagnosis can be made. I also wanted to emphasize the point that he made in saying that the most important single factor in the diagnosis of acute appendicitis in children is local tenderness. It requires some little time to get the confidence of the child before one can get anything as to the difference in resistance in the abdominal muscles. I have been very much interested in watching the pediatricians in just this particular in their contact with children and realize that after gaining confidence this sign becomes most valuable.

Dr. ROY ANDREWS, Mankato Clinic, Mankato, Minn.: We know that pyelitis in younger children is generally without any definite symptoms but pyelitis in older chil-

dren may have definite manifestations. I recall two cases we had of children over six years of age that were brought in with a diagnosis of appendicitis made by the parents themselves. They had severe pains in the right side, intermittent in character but with an absence of local tenderness which we would expect in a child of that age. The urine of these children was loaded with pus and some blood. We must remember that pyelitis is not so easy to diagnose, that is, the first specimen of urine does not always tell us the story. Many times it will take three or four specimens of urine before one finds pus.

Another condition that has puzzled me and will continue to puzzle me is retrocecal appendicitis in children. Usually they are difficult to diagnose because the tenderness and spasticity come on rather late. I think it is very difficult to make an early diagnosis of retrocecal appendicitis.

DR. T. L. BIRNBERG, St. Paul: It has given me great pleasure to be here today and hear this paper. The subject of appendicitis in children has been a thing that has puzzled me a great deal. You always hear the surgeons talking about operations for appendicitis but I must confess in our work we have had very few appendices. I often wonder if we have had them and were not able to diagnose them. The differential diagnosis is one of extreme importance, and as Doctor Judd said we must gain the confidence of the patient and slowly make our diagnosis. I get considerable benefit by asking the child to himself show me where his pain is. After he shows with the palm of his hand, as he always will, I ask him: "Please, with your one finger show me the place that it hurts." Now: "Which place does it hurt the worst?" Meanwhile talk with him about school, the school teacher, and things of that nature and get his mind on different things. Gradually his fear will relax and you get what you are after.

There are two things in differential diagnosis of great importance, pyelitis and pneumonia. Those must be ruled out in every case before operation. I make it a rule that no patient should be operated for appendicitis before a urinary examination is made and an x-ray of the chest. Surgeons are very prone, when they examine a patient and find pain in the side and temperature, to say: "We will take out the appendix right away." These findings are very good and very accurate in adults but in children they are misleading and we are not willing to take the risk in doubtful cases. It is better to be safe and operate an hour or two later than to operate on a pneumonia case. We have seen a good many other pneumonias after appendices through mistaken diagnosis.

The question of diarrhea. In adults constipation is the rule in appendicitis cases but it is not unusual in children to have loose bowels and very small, frequent stools. Small, frequent stools are a little unusual in infants in appendicitis. The high temperature often worries a surgeon, he will be afraid of 103 and 104 Fahrenheit. I must confess that whenever a high temperature is presented I think first of pyelitis or pneumonia and appendicitis last. Do not pay too much attention to high temperature in children, because it might be run in an effort of thermotaxis. The temperature will suddenly go high without great cause, as well as the leukocyte count. The leukocyte count in children may go up very high without being of much consequence.

THE CHAIRMAN (Dr. H. Z. Giffin, Rochester): Anything that will assist in the diagnosis of appendicitis in these very young children it seems to me is most important. I am afraid that the rectal examination is apt to be neglected in young children. In appendicitis a sensitiveness in the right lower quadrant by rectal bimanual examination can almost always be elicited; moreover, a pelvic abscess is not infrequently detected by this method when abdominal symptoms are confusing.

DR. R. C. LOCEFEIL, Minneapolis: I am reminded of a case in which I was called in consultation, a short time ago. It was a child about ten years of age who had been running a temperature of about 103 in the evening for the past three or four days. At times the child complained of some pain in the abdomen but there was no nausea or vomiting. When the surgeon had seen the case the temperature was normal and the leucocyte count somewhere between 15,000 and 20,000. On account of absence of tenderness and rigidity in lower right abdomen, he made a temporary diagnosis of a central pneumonia and advised an x-ray. I was called in to see the child the next morning and found that the x-ray was negative as well as the urine examination, the latter ruling out a possible acute pyelitis.

On examination I found the child complained mostly of pain in the lower part of the right chest especially when taking a deep breath. I followed Dr. Birnberg's hint, which I learned when I was under him at the City and County Hospital, by asking the child to show me the exact point of tenderness with one finger. She could not do this as it seemed to hurt over the entire lower chest and upper abdomen on the right side. I am frank to say I did not have the nerve to make an exact diagnosis of anything but I believed on account of the definite rigidity and slight tenderness in the upper right quadrant, that there must be an acute abdominal condition present, and advised operation.

Another surgeon was called in consultation after I saw the case and he, for no reason that I could see, unless he had more nerve, diagnosed an acute pus gall-bladder and the case was operated half an hour later. I had the opportunity of witnessing the operation and saw the surgeon reveal a long retrocecal gangrenous appendix which extended upwards toward the liver with a ruptured tip and an abscess just below the gall-bladder. There was a localized peritonitis with a hepatitis and I assume an inflammation of the peritoneal surface of the diaphragm which accounted for the pain on breathing. I certainly can agree with those who have spoken before me, namely, that the diagnosis of acute appendicitis in children is often very difficult.

DR. H. T. HELMHOLTZ, Rochester (closing): I want to emphasize again what Dr. Judd has said about the difficulties of the differential diagnosis of pneumonia and appendicitis and to say that I think it is better to operate on an occasional pneumonia, thought to be appendicitis, than to let an acute appendicitis go to generalized peritonitis.

With regard to pyelitis, I must confess that I have never encountered this difficulty; I suppose because of my interest in pyelitis that is always the first thing I think of. The only case in that connection that we did have difficulty with

was an acute hydronephrosis, in differentiating it from an acute appendiceal abscess.

Another thing that I would like to emphasize in connection with the differential diagnosis of pyelitis and appendicitis is the value of a catheterized specimen and the presence of bacteria at a time when pyuria is not present. I think particularly in these early cases one might find a urine swarming with bacteria when there is no pus and it be of great help in the diagnosis.

In conclusion I want to thank those who have discussed this paper in bringing out in detail some of the points I could only lightly touch on.

But it is a secondary matter, after all, whether a school is under State or University control, whether the endowments are great or small, the equipments palatial or humble; the fate of an institution rests not on these; the inherent, vital element, which transcends all material interests, which may give to a school glory and renown in their absence, and lacking which, all the "pride, pomp, and circumstance" are vain—this vitalizing element, I say, lies in the men who work in its halls, and in the ideals which they cherish and teach. There is a passage in one of John Henry Newman's Historical Sketches which expresses this feeling in terse and beautiful language: "I say then that the personal influence of the teacher is able in some sort to dispense with an academical system, but that system cannot in any way dispense with personal influence. With influence there is life, without it there is none; if influence is deprived of its due position, it will not by those means be got rid of, it will only break out irregularly, dangerously. An academical system without the personal influence of teachers upon pupils, is an Arctic winter; it will create an ice-bound, petrified, cast-iron University, and nothing else."

Naturally from this standpoint the selection of teachers is the function of highest importance in the Regents of a University. Owing to local conditions, the choice of men for certain of the chairs is restricted to residents in the University town, as the salaries in most schools of this country have to be supplemented by outside work. But in all departments this principle should be acknowledged and acted upon by trustees and faculties, and supported by public opinion—that the very best men available should receive appointments. It is gratifying to note the broad liberality displayed by American colleges in welcoming from all parts teachers who may have shown any special fitness, emulating in this respect the liberality of the Athenians, in whose porticoes and lecture halls the stranger was greeted as a citizen and judged by his mental gifts alone. Not the least by any means of the object lessons taught by a great University is that literature and science know no country, and, as has been well said, acknowledge "no sovereignty but that of the mind, and no nobility but that of genius." But it is difficult in this matter to guide public opinion, and the Regents have often to combat a provincialism which is as fatal to the highest development of a University as is the shibboleth of a sectarian institution.—From *Teacher and Student*, William Osler.

## THE MORE COMMON NEUROLOGIC DISORDERS ASSOCIATED WITH PAIN, AND ENCOUNTERED IN GENERAL DIAGNOSIS\*

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Although the medical profession, in general, casts an indifferent or a scornful eye on the pagan subject of neurology, the fact remains that no less than 10 per cent of patients examined present some neurologic symptoms or aspects that enter into the general diagnosis. This is particularly true of nervous disorders associated with pain. The spread of an impulse to every part of the neuron provides many pitfalls in diagnosis, and disappointment for the surgeon who finds that the disease refuses to respond to the rites employed to banish it.

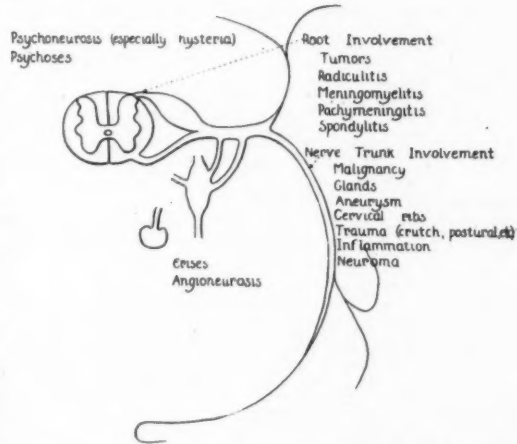


Fig. 1. Diagrammatic survey of nervous disorders that often enter into differential diagnosis.

In the process of diagnosis it is customary to visualize such structures as the liver and the stomach, but the nervous system is habitually disregarded, a practice which sooner or later leads to difficulties that might have been obviated had some such simple diagram, as is represented in Figure 1, been kept in mind.

Lesions within the substance of the brain or spinal cord, while at times associated with pain, do not lead to diagnostic difficulties sufficiently often

\*Presented before the Medical Section of the Minnesota State Medical Association, St. Paul, Minnesota, October 10-12, 1923.

to warrant extensive discussion. An exception must be made with regard to tumors of the brain, extracranial neoplasms, such as nasopharyngeal malignancy, and various neuralgic and painful disorders around the head for which optometric, nasal, and dental manipulations are often instituted. However, attention is here directed more particularly to root pains, and to abdominal crises, the origin of which is probably in the vegetative nervous system.

#### ROOT PAINS

Root pains are often erroneously interpreted as intercostal neuralgia, pleurisy, pericarditis, appendicitis, cholecystitis and kindred abdominal conditions, lumbago, and sciatica. They usually present characteristic features, most typically seen in pressure from spinal cord tumors, that should lead us to suspect the possible nature of the lesion, al-

though the ultimate proof may be very difficult. Table 1 illustrates the salient features of root pains and the points of contrast and similarity as applied to sciatic neuritis, with which it is often confused.

#### ILLUSTRATIVE CASES

Case 1 (A438405). *Spinal cord tumor with pain leading to multiple operations.* Mrs. C. S., aged twenty years, complained chiefly of pain in the right lumbar and abdominal areas. One and one-half years before, a dull ache appeared to the right of the second lumbar spine, radiating laterally to the lower costal margin. The pain was more constant at night and caused the patient to sleep in a chair. Fourteen months before, the appendix and part of the right ovary had been removed without relief; eight months before, the pain radiated to the right knee, and a cast was applied to the leg for several weeks. Four months before, the remaining portion of the right ovary was excised without benefit.

The patellar and tendo achillis reflexes were slightly

TABLE 1.

THE MORE CHARACTERISTIC FEATURES OF ROOT PAINS AS COMPARED WITH THOSE OF SCIATICA

	ROOT PAIN	COMMON TO BOTH	SCIATICA
Location:	Anywhere. Referred to peripheral distribution of neurone. At first unilateral, later bilateral (girdle) and symmetrical.	May be same.	Buttock, posterior aspect of thigh, calf. Rarely bilateral.
Character:		Usually dull ache.	
Onset:	Gradual.		Often acute, especially after strain, exposure or "cold."
Course:	Continuous or recurrent. Spreading to contiguous territory, especially to opposite side; growing in intensity.	Reappearing at intervals. Worse on coughing, sneezing, straining.	First attack often the worst. Field of activity unchanged.
Tenderness:	None.		Present at nodal points.
Flexion of head:	Aggravates pain.		No change.
Kernig and Lasègue:		Present, especially if tumor is low.	
Spine:	Often fixed.	Listing common.	
Temperamental idiosyncrasies:	Without pain on retiring; awakened at 3:00 a. m. by pain, relieved by kneeling or exercise. Returns to bed toward morning. Often prefers to sleep sitting in chair.		Often kept awake by pain on retiring. Pain wears off gradually, allowing patient to sleep. Worse on exercise. Worse on sitting in chair.
Weather and temperature influence:	None.		Often striking. Pain worse on cold, relieved by heat.
Neurologic findings:	Sensory, motor, reflex, and spinal fluid.		Tendo Achillis reflex often absent in severe cases. Nodal tenderness. Positive Lasègue.



more active than normal; positive Babinski reflex was present on the right, a doubtful one was noted on the left. Vibration and joint sensibility were slightly impaired over the right lower extremity. There was slight urinary urgency. The spinal fluid was straw colored, the Nonne reaction was positive, there was one lymphocyte, zone I colloidal benzoin reaction, and no fluctuation on jugular pressure. An extramedullary cord tumor was removed from the anterior aspect of the seventh thoracic segment.

The appearance of this patient did not indicate any abnormality of the nervous system. She walked without difficulty, was aware of no disturbance of sensation, and suffered no impairment of sphincter control. The story of characteristic root pain, however, at once suggested the possibility of a spinal cord tumor. (Fig. 2.)

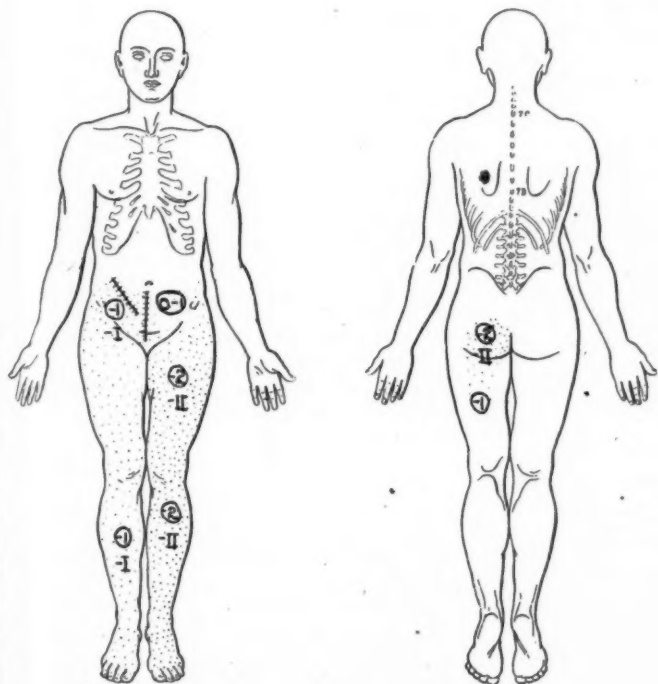


Fig. 2. Case 1 (A38405). Spinal cord tumor with pain leading to multiple operations. The general appearance of this patient did not indicate any abnormality of the nervous system. (The Arabic numerals refer to tactile sensibility, the encircled Arabic numerals to pain sensibility, and the Roman numerals to temperature sensibility. 0 signifies normal, and —4 complete loss, intermediate figures representing intermediate degrees. The plus sign represents increase, +4 being the maximum.)

Case 2 (A386055). *Caudal tumor masquerading as sciatica for ten years. Hypertrophic arthritis.* Mr. J. C. McL., aged fifty-two years, had developed a dull pain in the left sacro-iliac region, thigh, knee, and calf, ten years before examination at the Clinic. The pain was worse at night and was relieved by exercise, so that the patient often worked at night. There was no relation to changes

in the weather. Five years before, his teeth had been extracted and tonsillectomy performed without relief. Three years before, the pain extended to the right side of the back and down the right leg, so that he was unable to lace his shoes. The pain disappeared for two years following the administration of laudanum and salicylates by rectum, and changing the style of shoes. For the last thirteen months the pain had been worse and the patient used morphin daily. He never missed his work.

The Lasègue sign and Nonne test were positive. Hypertrophic arthritis of the lower dorsal spine was diagnosed roentgenologically. A neurofibroma was removed from the level of the second lumbar vertebra.

The objective neurologic findings included only the positive Lasègue and the positive Nonne tests. It was largely on the basis of the history that this patient was explored for a caudal neoplasm. The

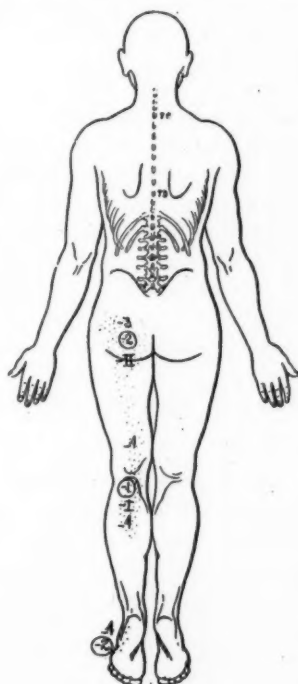


Fig. 3. Case 3 (A380470). Caudal tumor simulating sciatica.

hypertrophic arthritis, which was observed in this case, is commonly associated with cord tumors, and often confuses the diagnosis.

Case 3 (A380470). *Caudal tumor simulating sciatica.* Mr. W. S., aged thirty-five years, complained of sciatica. Three and one-fourth years before, he had contracted flu,

and during the attack remained in a shack without food for one and one-half days, the temperature being 36° below zero. Following this, severe pain appeared in the lumbar spine, left hip and thigh. The pain occurred more often at night, when the patient slept in a chair, or obtained relief by walking. He could "tell when the sun set and when it rose" by the intensity of the pain. There was no relation to the changes in the weather. For two months he had had a constant tingling sensation along the outer surface of the left thigh.

The patient listed to the right. Flexing the head caused an increase of the pain in the left leg. The Lasègue sign was positive. The left tendo achillis reflex was absent. There was marked impairment of tactile sensibility and slight impairment of pain and temperature sensibility over the posterior aspect of the left leg and the lateral aspect of the foot (Fig. 3). The first, second and third lumbar spines were tender. The Nonne test was positive, and there were seven lymphocytes. Chondrofibroma arising from the third sacral intervertebral disc was found at operation.

Root and nerve trunk pains are often one of the earliest indications of a malignant process. In the search for a possible primary focus, a rectal examination, the elimination of the possibility of a primary carcinoma of the lung, and inspection of the nasopharynx should never be neglected. Involvement of the posterior root ganglia is well exemplified in herpes, which may be followed by a post-herpetic neuralgia. Doubtless a ganglionitis is not always evidenced by vesicle formation, and presumably a typical herpetic neuralgia may develop without the preliminary appearance of vesicles.

#### GASTRIC AND ABDOMINAL CRISES OF NEUROSYPHILIS

Gastric and abdominal crises are almost always an expression of parenchymatous syphilis of the central nervous system, but may be associated with migraine, angioneurotic edema, and unknown causes in apparently healthy persons. Crises are usually typical and present certain characteristics. The onset is sudden, with pain or vomiting, usually both, but either may occur singly, or there may only be flatulence, extreme nausea and sialorrhea. The pain is usually near the middle-line, and symmetrical; it may be dull, sharp, aching, cramping, squeezing, gripping, burning, or numb in character. The intensity may be mild or grewsome, and the duration from a few hours to several days. The pain is rarely continuous, and ceases suddenly. There is no interval abdominal complaint, unless the condition is complicated as by ulcer. The crises are recurrent, and the intervals vary widely. There is no tenderness to deep pressure, but there may be

marked hypersensitivity to light touch, and objective evidence of syphilis is usual.

Of 120 patients with syphilitic gastric crises, thirty-one (25.8 per cent) were operated on. (Table 2.)

TABLE 2

#### OPERATIONS IN 120 CASES OF SYPHILITIC GASTRIC CRISES

Appendectomies .....	20
Operations on gallbladder.....	14
Operations on stomach.....	12
Operations on pelvis (ovaries removed in five cases; tubes in one, suspension in one).....	8
Operations on kidneys (Dietl's crisis one).....	3
Adhesions .....	3
Exploration .....	2
Reduction of colon.....	1
Total .....	63

#### ILLUSTRATIVE CASES

Case 4 (A334732). *Gastric crises of tabes: multiple operations.* Mr. G. D., aged thirty-six years, had had specific urethritis, and possibly syphilis, at the age of twenty years. At the age of twenty-nine he experienced his first gastric crisis, which awakened him at 2:00 a. m.; appendectomy was performed at 5:00 a. m. At the age of thirty-one an operation was performed for adhesions, and one year later a gastro-enterostomy; four years later 15 cm. of "kinked ileum" was resected, with return of another crisis before the patient left the hospital. The attacks were grewsome in their intensity, and reduced the patient to a groaning, quivering heap.

Examinations were negative except for positive Wassermann and Nonne reactions, and 18 lymphocytes to a cubic millimeter of spinal fluid.

Case 5 (A374807). *Gastric crises of tabes: multiple operations.* Mrs. C. H., aged thirty-seven years, had had typical gastric crises five years before. At the same time the right eye deviated outward with subsequent diplopia. Four years before, the appendix had been removed without relief; the gallbladder was then drained with similar result, and subsequent gastropexy proved unavailing.

Right ptosis, complete bilateral external rectus paralysis, irregular and Argyll Robertson pupils, absent patellar and tendo achillis reflexes, very active abdominal reflexes, and reduced muscle tenderness were noted. The serologic examination was negative.

The abdominal scars testify to the splendid resilience of this tabetic patient. The complete right sided ptosis, the bilateral external rectus palsy, the irregular, Argyll Robertson pupils, the absent patellar and tendo achillis reflexes had no restraining influence on the persistent endeavors of surgical research to disclose some point of visceral strategy from which these symptoms seemed to emanate. (Fig. 4.)

Case 6 (A273093). *Gastric crises of tabes: multiple operations.* Mrs. W. J. S., aged fifty years, had contracted syphilis thirty years before. For the last four years she

had suffered greatly from "rheumatic" lightning pains and attacks of abdominal pain associated with vomiting. Two years before she was temporarily blind in both eyes. Eleven months before, an operation had been performed on the gallbladder, and two weeks later a nephropepy was performed, both without relief.

Unequal and Argyll Robertson pupils, left optic atrophy, absence of right patellar reflex, diminished left tendo achillis reflex, absence of muscle tenderness, marked delay in pain sensibility, positive Wassermann reaction on the spinal fluid, and 36 lymphocytes to the cubic millimeter were noted. (Fig. 5.)

*Characteristic objective findings of parenchymatous neurosyphilis.* Case 6 was introduced in order

Typically they are sharp in character; short in duration, as though the patient had been shot through the leg or touched with a lighted cigarette; spot-like more often than lightning-like, so that the painful spot might be covered easily by a silver dollar; severe or mild in intensity; they appear in showers, are present usually in the lower extremities, are not limited to the regions of joints, and may leave the skin hypersensitive to light touch, but not to heavy pressure.

Fixed pupils or even Argyll Robertson pupils, which react to accommodation, but do not react to

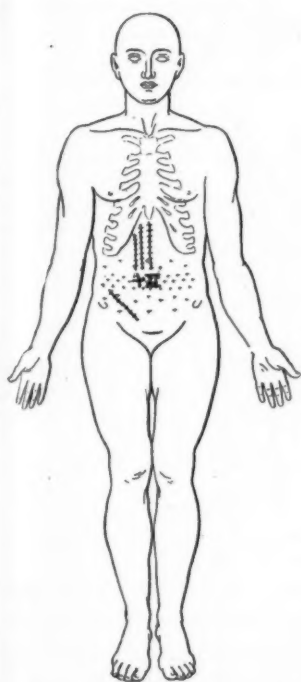


Fig. 4. Case 5 (A374807). Gastric crises of tabes. Multiple operations. The abdominal scars testify to the splendid resilience of this tabetic patient.

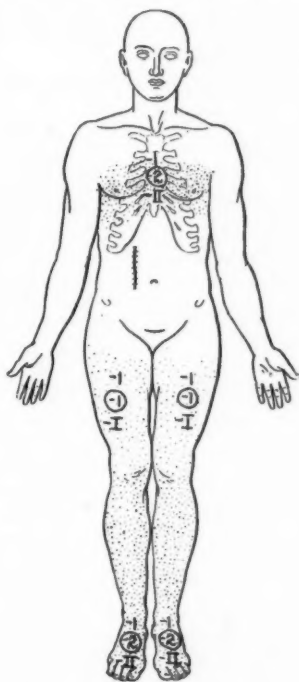
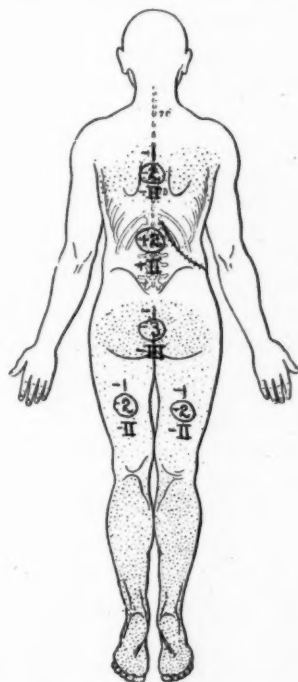


Fig. 5. Case 6 (A273093). Gastric crises of tabes. Multiple operations showing characteristic objective findings of parenchymatous neurosyphilis.



to show some of the very characteristic objective findings of neurosyphilis. A closer analysis of the "rheumatism" revealed typical lightning pains. Formerly as many as seventy-five kinds of pain were differentiated. Today very few are considered characteristic of an illness. Lightning pains are almost pathognomonic of parenchymatous syphilis of the central nervous system; they rarely occur in cases of diabetic multiple neuritis, syringomyelia, or in healthy persons, without demonstrable cause.

light, are no longer considered pathognomonic of syphilis. They may be present with epidemic encephalitis, and may be familial, although rarely. If they are unequal and irregular as well as Argyll Robertson, they usually indicate syphilis. A diagnosis of neurosyphilis, however, should never be made on one sign alone.

The patient in Case 6 also had a chest zone of diminished sensibility, which may involve any quality of superficial sensation. Oppenheim re-

lates the case of a woman who in the course of a banquet pinned a flower to her waist, passing the pin through the underlying breast. She was unaware of this until she discovered the fact on undressing that night. While a chest zone may occasionally be noted in other nervous diseases, such as in syringomyelia, it is ordinarily strong evidence of syphilis. In this case, furthermore, pain sensibility was delayed longer than touch sensibility in the feet; when the feet were pricked with a pin, the patient perceived the touch of the point before she felt the pain. This delay is seldom noted in any disease other than parenchymatous neurosyphilis.

Finally, there was an absence of normal muscle tenderness. When one of the bellies of the gastrocnemius muscle is pinched firmly, the patient normally gives lively evidence of pain. When this tenderness is absent in the presence of voluntary movement or fairly intact cutaneous sensibility, the possibility of syphilis should suggest itself at once. In multiple neuritis the tendon reflexes are often absent as they sometimes are in tabes, but in the former, muscle tenderness is exquisite, while in tabes it is often greatly impaired or absent.

#### ABDOMINAL CRISES OF NON-SYPHILITIC ORIGIN

Abdominal crises are not alone seen in cases of parenchymatous syphilis. The patient in Case 7 obviously had syphilis, but the appearance of the crisis evidently antedated the syphilitic infection.

#### ILLUSTRATIVE CASES

Case 7 (A328858.) *Abdominal crises (migraine? syphilis?)*; multiple operations. Mrs. J. H., aged forty-six years, had had periodic headaches since the age of twelve years; at the age of twenty-three, abdominal pains were associated with the headaches. The pain was most severe in the right upper quadrant, was continuous, sharp and cutting, and associated with vomiting; it lasted about six weeks. The patient had lost 75 pounds in weight. Morphine was required for relief. She was married at the age of twenty-eight. Eight years before examination, she had developed unsteadiness in walking, girdle pain, hyperesthesia of the abdomen to cold and heat, lightning pains, incontinence and impaired vision. Five years before, the gallbladder was explored and found to be negative. The patient's mother had had migraine headaches with vomiting; one brother had had abdominal crises of pain without vomiting or headache ever since he was eighteen; another brother had had intense abdominal crises of pain and vomiting with headaches since the age of eighteen; and one son had abdominal crises of pain, with or without vomiting, but always with headache.

Nystagmus to the right, unequal, irregular, Argyll Rob-

ertson pupils, absence of the right patellar reflex, slight ataxia, slight impairment of joint sensibility in the toes, absence of vibratory sensibility over and below the pelvis, impaired tactile sensation with localized hyperhidrosis over the fourth dorsal segment on the right, marked impairment of pain sensibility, and slight urinary incontinence were noted. The serologic examination was negative. (Fig. 6.)

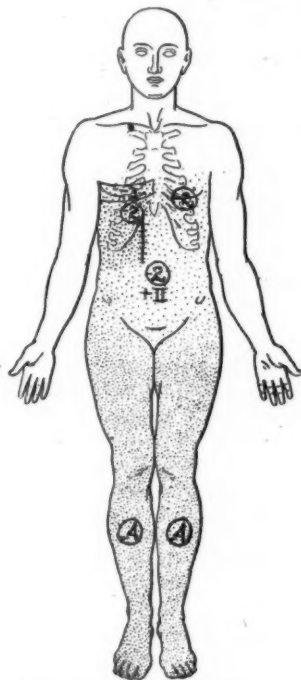


Fig. 6. Case 7 (A328858). Abdominal crises of migraine (?) in a patient having tabes.

*Abdominal migraine.* Buchanan has discussed the abdominal manifestations of migraine, and Moersch has emphasized the protean expressions of this disorder. The existence of abdominal migraine is not only questioned, but openly ridiculed in certain quarters. This attitude calls to mind the story of Francisco Sizzi, a Florentine astronomer, who argued against Galileo's discovery of a new planet in the following manner: "There are seven windows in the head, two eyes, two ears, two nostrils, and a mouth" (which we may paraphrase by saying, the appendix, the stomach, the gallbladder, and so forth). "From which, and many similar phenomena in nature, such as the seven metals, the seven days of the week, and so forth, which it were too tedious to enumerate, we gather that the number of planets is necessarily seven." The abdominal crises of migraine are particularly interesting,

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since the diagnosis depends entirely on the history of the case.

Case 8 (A278573). *Appendectomy and abdominal exploration without relief.* Miss E. H., aged twenty-eight years, had begun at the age of twelve years to have attacks of black spots before the eyes for five minutes, blindness for three-quarters of an hour, aphasia three and three-quarters hours, intense headache for from two to four hours, followed by abdominal pain of four to five hours' duration (at times so intense as to require morphin for relief), and continuous vomiting, without pain, for from three to four days. At the completion of the attack, a watery evacuation of the bowels occurred. The headache stopped at the age of seventeen, but the abdominal attacks continued. At the age of twenty-four appendectomy was performed, and four years later a negative abdominal exploration, without relief. The family history was negative.

Detailed examination, including full investigation for syphilis, was negative.

Case 9 (A245593). *Asthma; angioneurotic edema; local syncope, and duodenal ulcer.* Mr. H. C. S., aged fifty years, had had attacks of abdominal pain since the age of sixteen, coming on about four times a year, and of three or four hours' duration. The pain was intense, epigastric, accompanied by nausea and vomiting, and relieved somewhat by pressure. Attacks were always introduced by brilliant, scintillating scotomas followed by blindness. There was no headache. The patient also distinguished other types of pain, evidently related to duodenal ulcer. His mother had had attacks of "terrific abdominal pains" associated with blindness and vomiting of from three to four hours' duration, coming on about twice a year for ten years. A brother had similar attacks. One sister and one brother suffered from severe attacks of migraine headaches. For the last seven years the patient has had attacks of asthma, and for the last year angioneurotic edema, the swelling persisting for three days at a time. There were also local syncopal attacks involving the fingers. The asthma, edema, and blanching were not familial.

All skin tests were negative. There was fluctuating eosinophilia from 15 to 55 per cent, with 16,000 leukocytes. The diastolic blood pressure was 92, the systolic 60. Roentgen-ray examination revealed a duodenal ulcer. Pleurisy, adhesive pericarditis, slight fatty changes in the liver, thickened walls of the gallbladder, one healed gastric ulcer, and one active duodenal ulcer were found at necropsy.

Most patients with abdominal crises of the migrainous type have had at least one abdominal operation with negative results.

*Abdominal disturbances associated with brain tumors.* In some instances the vomiting and abdominal discomfort associated with brain tumors have led to operation on the abdomen. This is particularly true of fourth ventricle tumors.<sup>5</sup> The abdominal distress complained of by these patients is possibly vagal in origin.

Vascular disturbances of the peripheral vessels may be associated with intense pain and anesthesia. This is particularly true of thrombosis or embolism of the vessels producing ischemia or infarction neuritis. Palpation of the vessels helps to establish the diagnosis.

Pain in cases of amputation-neuroma is many times central in origin and cannot be relieved by incision of the neuroma, injection of the plexus, or section of the posterior roots. Needless to say, in these cases of psychalgia, peripheral operations only aggravate the pain.

*Pains of hysterical origin.* We often fail to acquaint ourselves with the endeavors of mental analysis and mental hygiene. Our mental and emotional operations have no limitations. Like the philosopher's description of the universe, they are like a huge sphere whose center is everywhere and whose surface is nowhere. That we must be on the alert constantly is illustrated by the case of a woman who came to a physician complaining of pain in her side, for which her appendix was removed. Pain in both hands and in both feet, which she insisted on talking about, was disregarded. She later confided, with ecstasy, that she was Christ crucified. The diagnosis of hysterical conditions is, however, seldom so transparent, and we all contribute amply to the monumental blunders committed in this field.

Case 10 (A402420). *Hysterical pain and paralysis of foot, of six months' duration, treated as a tuberculous ankle.* Miss A. A., aged seventeen years, had tripped on the school stairs and sprained her right ankle six months before coming to the Clinic. The doctor who was called shook the foot roughly and told her to use it. Following this, the foot became extremely painful, and she could not move it. Another physician applied a cast for three weeks, with no improvement. The condition was diagnosed tuberculosis of the ankle and an operation discussed.

There was loss of voluntary movement of the right leg and foot, "exquisite tenderness," and emotional lability. The patient's father had died recently, leaving a large family without resources. Her mother was a "crêpe hanger." The patient was much hurt by the lack of sympathy on the part of the first physician, greatly impressed by the extreme solicitude of the second, by the cast, and by the prospect of operation. She recovered under treatment by suggestion and faradism.

Case 11 (A432880). *Hysterical dyspraxia and pain.* Mrs. F. M., aged thirty-four years, complained chiefly of pain and disuse of the right arm and fingers, pain in the right abdomen, hip, knee, and spine. The "whole right side was bad." Five years before, much to her distaste, but compelled by circumstances, she had taken a stenog-

rapher's course. While doing this, a dull pain appeared in the right hand which drew away from its task involuntarily on every effort to use it; she felt as though the fingers were torn out at the roots. The patient became nervous, had spells of crying, shaking, universal numbness and rigidity with loss of speech and movement, but retention of hearing. She was given hypodermic injections of morphin almost daily because of abdominal pain, for a period of two years. She was told that the right ovary was diseased. Three and one-half years before coming to the Clinic, tonsillectomy had been performed, and three years before, appendectomy, without relief.

The objective examination was negative, except for obviously hysterical dyspraxia in the use of the right hand, shifting areas of tenderness, and excessive emotional lability. The patient had married first at the age of sixteen; she gave birth to a daughter at the age of eighteen. The husband was drowned when the patient was twenty years of age. She was married a second time to a young man whom she loved, but whom she left because he did not support her. (This marriage was kept secret until discovered through a dream the patient related.) The stenographic course was taken at the age of twenty-nine. She could not earn her living and failed at five positions. She married a wealthy bachelor, aged fifty-six years, for whom she did not care. This man was extremely jealous, and encouraged the patient's undisciplined daughter, aged sixteen years, to marry a shiftless wretch many years her senior. The patient had often dreamed that she saw a recent picture of herself, which stands framed on her husband's dresser, replaced by one taken before her third marriage, when she was a beautiful young woman. A very common dream is that the patient is walking along the street when she is accosted by a very handsome young man (her second husband) who asks for her telephone number. At this moment a horrible old man, all covered with long black hair, jerks her away and threatens to arrest her for talking to a stranger. (The striking thing about her present husband is his "beautiful long black hair.") She declares her innocence. In a recent dream, the patient, with the assistance of a young doctor, is shaking a bowl of urine on which is floating a greasy substance.

Popular misconceptions, and sometimes even physicians, are responsible for the development in patients of an anxiety neurosis, from which they suffer more intensely than from the disease. Such anxiety is often aroused inadvertently by the physician's silence, or by implication of a diagnosis not yet justified or possible. Much harm and seldom good may be done by adding the element of fear. One patient, having long since recovered from his physical illness, felt that he must continue being ill and unable to work because he had been told that he would be so for about four years. A bugaboo too often attaches to the following diagnoses, leading to unnecessary invalidism: pre-incipient tuberculosis (compare the good morale, lack of fear, and co-operation of patients who know

they have the disease, in sanitariums); high blood pressure, will be dead in a year; heart disease; cancer, which they have not; Bright's disease; masturbation (when the Sunday school teacher, reformer, and quack too often advise gratuitously; unfortunately the doctor is seldom consulted). There are more suicides on bright sunny days than on cloudy days, and there are almost no suicides during catastrophes. Our patients' fears, self-indulgences, and complexes should be discovered, removed, and replaced by common sense and a robust philosophy.

The neurologic conditions most often missed in diagnosis, and which consequently lead to abdominal operations are: gastric and abdominal crises, usually syphilitic; root pains, usually in cases of cord tumor; vomiting due to cerebral lesions, especially tumors of the fourth ventricle, when associated with abdominal distress; hysteria or family traditions, such as "Brown's stomach"; and constitutional somatic deficiency, and biologic inferiority.

Neurologic diagnoses too frequently made are neuritis (for root pain, referred pain, myositis, bursitis, vascular disturbances, especially thrombosis and embolism); neuralgia, especially the rare condition of intercostal neuralgia; functional disorders, for example, telegrapher's cramp, to explain pain; and syphilis of the nervous system. These errors are seldom due to inadequate knowledge in a special field, but usually find their source in faulty histories, and in the attempt to treat the patient's body to the neglect of his mind. As Seneca said centuries ago, "The two blessings of life are a sound body and a quiet mind."

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#### DISCUSSION

DR. ARTHUR S. HAMILTON, Minneapolis: Doctor Woltmann has just given us a very well prepared and carefully considered paper, as he always does. I am glad that he particularly emphasized the question of root pains. I think

root pains are not well enough understood, not enough attention is ordinarily paid to them. I suppose that pain is the most common complaint with a patient; certainly it is in neurologic lesions. The patient comes complaining of some kind of pain or distress from which he or she wishes relief. In a general way there are two classes of pain, perhaps not very clearly divided in fact, much less in our minds, but in a general way we think of pain as due to an organic situation and pains of functional origin. Under functional we may include cases where the patient complains, such as malingerers who pretend they suffer pain although they do not.

There is something more or less characteristic in the way people present their complaint of pain. A man who has a pain of organic origin will locate it always in the same spot. He has no particular difficulty in telling you where it is and he outlines it clearly. If he has any occasion to speak of it or to return to it under different points of his examination he gets it about the same; whereas it is really very striking how functional pain is always complained of at some one point in the examination as very severe, and yet you come around some time later in the examination to the same part and the same part of the story and somehow the pain seems to have been moved.

A man who has an organic pain can usually outline it clearly; if you ask him where the pain is he can outline it clearly with his finger; but the man who has a functional pain is very much more likely to pass his hand loosely over some part of the body and say: "It is about here." I was reading an article the other day by Dr. Spellman and Dr. Fraser of Detroit, on a series of cord tumors, and I noticed a striking thing. They took a considerable series of cord tumors such as came back over quite a period of time, and the average time from the onset of the first symptoms that were more or less suggestive of what the trouble might be until a diagnosis was actually reached was 2.5 years, which seems a rather long time, I think a longer time than is necessary.

I remember one of those cases particularly; Doctor Woltmann knows the case because he deserted me later on and went to him. A man had had an operation for gallstones. As far as I could find out there was a pretty vague statement of what was found at the operation. He had a definite pain in the region of his gallbladder, to be sure. Just exactly why the pain should have gone away after the operation I don't know, but he said it did. By and by it came again and he went to another surgeon. He was operated upon for gallstones and this time it is clear that no gallstones were found. He was better for a while. Then he went to a third surgeon and he had a terrific pain in the gallbladder but, strange to say, he had this pain on the left side. I saw him and diagnosed it very quickly. Not only had he had the pain, the root agitation, but the thing had gone on so far that he had developed a definite numbness on the right side. Afterwards Doctor Woltmann informed me that they found a spinal tumor on this side and the man was relieved.

Root pains that occur in such cases as tumors of the cord are pretty suggestive from the beginning. I do not mean one can make a diagnosis of spinal tumor on the

basis of root pains appearing, but if the root pain appears in a definite region or is continuous, it may vary somewhat in degree but it is sometimes continuous and always in the same region it is at least a suggestive symptom. Then if there comes a pain on the opposite side of the body at the same level, it becomes a very suggestive thing, and here one should make a diagnosis as one sees the product so very clearly of a transverse myelitis of the cord substance due to some infection. When a man has a perfectly clear picture of a root pain on one side and a subsequent root pain on the other side, and after having such a situation lasting several months until the man becomes paralyzed, that syndrome does not suggest a myelitis at all, it suggests a pressure lesion on the cord.

There are other methods by which one may diagnose absolutely the actual organic pain from those of functional origin. As to malingering pain, if you do anything in the course of your examination which is supposed to bring on the pain severely and you have been observing the patient's pulse and you find there is no rise of the pulse at the time when you were supposed to be hurting him pretty severely, it is pretty positive evidence that the pain is not a pain of organic origin. That is the case particularly in the back, where so many patients complain of pain, and there is no contraction of the muscles. They remain relaxed throughout the examination and you have grave reason to doubt whether the thing is of organic origin. As I said before, it is rather striking how people will complain bitterly of a painful place of some sort in connection with their illness at one stage of the examination and you go on with the examination and come back to the same pain and the patient has apparently forgotten about the matter or if he has not wholly forgotten it he describes it in a different way and locates it in a different position.

Of course, it is well known that some people bear pain very much better than others. Some people complain a great deal of a small matter while others complain but little in a very serious matter. The question of numbness—I don't know as we can speak of this as a pain but it belongs in the field of sensation. It is widely known that patients who malingere in respect to total loss of sensibility almost always fail to make their loss of sensation in any way comply with the known sensation of the part, and he cannot even keep the limits of his loss of sensibility at the same point. The man is unable to outline things as they were before when you come back to your question. In situations of that kind we find a certain sense derived from experience that leads us to believe that the man is not dealing honestly with you in these cases of malingering.

I think there is another way in which you can distinguish real from simulated pain. If it is real pain and you touch anywhere near the affected part you get practically an instant response, but in the other case, as you recur to the area from time to time, you will find that it takes an effort of the memory of the person to evince pain and there is an appreciable interval of time before he registers pain.

DR. L. A. NIPPERT, Minneapolis: Before considering pain as a manifestation of a neurological disorder and re-

ferring our patient to the neurologist for treatment we should remember that its origin may be distant from the subjective location as the following cases which came to my mind as I listened to Dr. Woltmann's interesting and exhaustive paper will show:

CASE 1: A woman previously healthy taken with severe gripping pain in the pit of the stomach with nausea and vomiting. Examination of abdomen was negative. On the following day she herself drew my attention to a swelling in Scarpa's triangle which had not been exposed during the previous examinations. The diagnosis of strangulated femoral hernia was apparent.

CASE 2: Sciatica for which a patient had been treated for weeks was caused by a small spindle-cell sarcoma press-

ing on the nerve. It caused his death four years later by metastases in the brain.

CASE 3: Lumbago after having been treated by a number of physicians was found, after several negative x-ray investigations, to be due to an invasion of the vertebra by carcinoma, the primary focus of which was the prostate.

CASE 4: A young physician just recovering from a long exhausting attack of inflammatory rheumatism, pericarditis and endocarditis complained of pain in the right groin; after a few days caries of a lumbar vertebra was found to be the cause of his pain.

Therefore search carefully for a focus of pathology before assuming that the pain is a functional disturbance.

In the first place, in the physician or surgeon no quality takes rank with imperturbability, and I propose for a few minutes to direct your attention to this essential bodily virtue. Perhaps I may be able to give those of you, in whom it has not developed during the critical scenes of the past month, a hint or two of its importance, possibly a suggestion for its attainment. Imperturbability means coolness and presence of mind under all circumstances, calmness amid storm, clearness of judgment in movements of grave peril, immobility, impassiveness, or, to use an old and expressive word, *phlegm*. It is the quality which is most appreciated by the laity, though often misunderstood by them; and the physician who has the misfortune to be without it, who betrays indecision and worry, and who shows that he is flustered and flurried in ordinary emergencies, loses rapidly the confidence of his patients.

In full development, as we see it in some of our older colleagues, it has the nature of a divine gift, a blessing to the possessor, a comfort to all who come in contact with him. You should know it well, for there have been before you for years several striking illustrations, whose example has, I trust, made a deep impression. As imperturbability is largely a bodily endowment, I regret to say that there are those amongst you, who, owing to congenital defects, may never be able to acquire it. Education, however, will do much; and with practice and experience the majority of you may expect to attain to a fair measure. The first essential is to have your nerves well in hand. Even under the most serious circumstances, the physician or surgeon who allows "his outward action to demonstrate the native act and figure of his heart in complement extern," who shows in his face the slightest alteration, expressive of anxiety or fear, has not his medullary centers under the highest control, and is liable to disaster at any moment. I have spoken of this to you on many occasions, and have urged you to educate your nerve centers so that not the slightest dilator or contractor influence shall pass to the vessels of your face under any professional trial. Far be

it from me to urge you, ere Time has carved with his hours those fair brows, to quench on all occasions the blushes of ingenuous shame, but in dealing with your patients emergencies demanding these should certainly not arise, and at other times an inscrutable face may prove a fortune. In a true and perfect form, imperturbability is indissolubly associated with wide experience and an intimate knowledge of the varied aspects of disease. With such advantages he is so equipped that no eventuality can disturb the mental equilibrium of the physician; the possibilities are always manifest, and the course of action clear. From its very nature this precious quality is liable to be misinterpreted, and the general accusation of hardness, so often brought against the profession, has here its foundation. Now a certain measure of insensibility is not only an advantage, but a positive necessity in the exercise of a calm judgment, and in carrying out delicate operations. Keen sensibility is doubtless a virtue of high order, when it does not interfere with steadiness of hand or coolness of nerve; but for the practitioner in his working-day world, a callousness which thinks only of the good to be effected, and goes ahead regardless of smaller considerations, is the preferable quality.—From *Aequanimitas*, William Osler.

It has been said that in prosperity our equanimity is chiefly exercised in enabling us to bear with composure the misfortunes of our neighbors. Now, while nothing disturbs our mental placidity more sadly than straightened means, and the lack of those things after which the Gentiles seek, I would warn you against the trials of the day soon to come to some of you—the day of large and successful practice. Engrossed late and soon in professional cares, getting and spending, you may so lay waste your powers that you may find, too late, with hearts given away, that there is no place in your habit-stricken souls for those gentler influences which make life worth living.—From *Aequanimitas*, William Osler.

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# MINNESOTA MEDICINE

OFFICIAL JOURNAL MINNESOTA STATE MEDICAL ASSOCIATION,  
SOUTHERN MINNESOTA MEDICAL ASSOCIATION, NORTHERN  
MINNESOTA MEDICAL ASSOCIATION, AND MINNE-  
APOLIS SURGICAL SOCIETY

Owned and Published by  
The Minnesota State Medical Association.

Under the Direction of Its  
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Subscription Price: \$3.00 per annum in advance. Single Copies 25c. Foreign Countries \$3.50 per annum.

VOL. VII

MARCH, 1924

No. 3

## EDITORIAL

### The Mellon Tax Plan

The paramount issue before Congress and the American people today is the so-called Mellon plan of tax reduction. The need for increased taxation to meet the various governmental activities incident to the World War necessitated special tax measures. Authorities differ as to the advisability of the particular methods adopted. It has become more and more apparent that the distinction made between taxable and tax-exempt securities has greatly curtailed business enterprise and has affected business activities in general. The medical profession has been affected for the greater part indirectly by the situation.

In an article which appeared in the A. M. A. Journal for January 26, 1924, entitled "Why the medical profession should be relieved from present tax burdens," a concise statement appeared of the

arguments why certain changes in federal tax laws should be made.

Under the Harrison Narcotic Act, as amended by the Revenue Act of 1918, the narcotic license fee for physicians was increased from one to three dollars. Inasmuch as the income from this act from all sources largely exceeded the cost of the enforcement of the act, the increased fee is essentially a special tax discriminating against the profession. While the sum is rather insignificant to the individual physician, the total sum in Minnesota alone amounts to several thousands of dollars.

According to the present income tax laws, the physician may charge to professional expense certain items incurred in the pursuit of his profession. This includes membership in medical societies and traveling expenses in consultation work. The Commissioner of Internal Revenue has ruled, however, that expenses incident to medical society meetings or post-graduate study are not deductible from the gross income of the physician as not being strictly necessary professional expense. Such a ruling tends to restrict the attendance on medical meetings, discourages self-improvement in the physician and works to the detriment of the public at large.

The new federal tax law contemplates placing a lower tax rate upon earned incomes as distinguished from income from investments. The idea is a new one, but one which seems reasonable and one which would work to the benefit of the profession.

The poll of the nation at present being conducted by the Literary Digest is of interest and shows a predominance of opinion in favor of the Mellon plan. It would seem that those in opposition to the plan must be influenced by a narrow conception of the purpose of any tax. Any tax which discourages the branching out of business or professional activities is pernicious.

### Money Matters

The physician has been proverbially a poor financier. The present day physician is much more business-like in the management of his financial affairs than formerly, but there is room for improvement.

The practice of medicine is a profession and the evaluation of medical services in money is often a most difficult matter. In each locality, however,

fees for professional services are pretty well standardized while each physician is forced to modify his charges according to the patient's ability to pay. This does not mean that a physician should charge what the traffic will bear.

Efforts have been made by county societies from time to time to draw up fee schedules for the particular locality concerned. As a rule such schedules have been intended for the general practitioner and have affected only a small percentage of the membership. Fee schedules for surgical procedures are difficult to determine for one reason, because preoperative and postoperative care are such variable factors. Any schedule must of necessity allow considerable leeway in either direction, for each physician must use his discretion in charging his patients more or less than the scheduled fee according to the financial status of the patient. A schedule of fees would be of distinct value in workmen's compensation and insurance work as thus the fee rate would be established by the profession and not by insurance companies or the lower courts. After all is said and done, the fee schedule has not proved practical.

The distinction between free and pay patients should be more clearly drawn. Most physicians give a certain amount of their time and are glad to do so in connection with free hospital or clinic activities. The experience obtained in such work is generally considered ample compensation. This is fortunate, for the profession gets little credit from anyone for such service rendered. On the other hand, the profession has the right to demand that patients able to pay medical fees be not treated at free clinics, whether supported by state, county, city, or private society. Just because a clinic or hospital is supported by taxes is no reason why every one is entitled to free medical attention. If it is argued that every taxpayer is entitled to free care at a city hospital, for instance, the argument is equally sound that the medical staff is entitled to pay for services rendered. The medical profession donates its services to municipal and certain state hospitals and clinics, but the class of patients treated by such institutions should and can be controlled by the local medical society. The importance of competent social service work in connection with free clinics is apparent.

The conscientious physician is only too ready to offer a patient in financial straits the privilege of going to a free institution. Thus the free institu-

tion performs a service to patient and physician alike.

In recent years the state has undertaken the treatment of tuberculous and venereal disease, with the idea that the treatment of these transmissible diseases needs state assistance in order to prevent infection. The time element in the treatment of tuberculosis makes the financial drain on the afflicted individual particularly burdensome, and practically the profession has not suffered from the assumption by the state of the treatment of these individuals. The insistence on the treatment of venereal patients necessitates in a few instances the treatment of individuals well able to treat with private physicians. The dissemination of knowledge incident to state activities along these lines, as a matter of fact, has increased private examinations.

In certain localities the physicians have joined the local commercial credit bureaus and are thus in a position to know the deadbeats in a community. The physicians in the larger cities are at a distinct disadvantage in this respect. Business men in any community recognize the value and importance of credit bureaus and listings. It is high time that each county society established such a bureau. On the other hand, we are not in favor of medical societies acting as collection agencies.

The time has long since gone by when the physician sent out his statements every six months or kept no books at all. Statements should be sent out promptly on the first of each month. Business methods in the practice of medicine are no reflection on the profession and uniformity in such matters would do much to correct the impression generally prevalent that doctors' bills may be left to the last.

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## MISCELLANEOUS

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### ELECTRIC LIGHT AND POWER BONDS—A GOOD EXAMPLE OF THE THINGS THAT MAKE AN INVESTMENT WORTH BUYING

By SAMUEL O. RICE

Educational Director,

Investment Bankers Association of America

This article comes right down to specific classes of bonds and endeavors to convey essentials in what investments to buy and why to buy them. Electric light and power bonds of sound, well-managed companies are among the safest and most desirable investments. The reason, they are so

is because electrical companies are year into transmissi

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is because the demand for electricity is greater than the electrical industry can supply, although electrical companies are annually putting more than a billion dollars a year into extensions and improvements of their plants and transmission lines.

The foregoing is only one of many sound reasons why the electrical field is so desirable for investors. There are many others. But don't understand me to say that all electric light and power bonds are good buys. That is not true of any class of investments, commodities or property. The investor should have dependable information that the bonds he buys are those of sound, well-managed companies. He should know that the general field or class he contemplates investing in is sound. Electricity can sell more of its product that it can produce and the demand is constantly increasing. There is no substitute for electricity. But all electrical companies are not well-managed or conditions in some locality may make it difficult for a company to succeed although it be engaged in one of the most prosperous lines of business in the world.

Sales of electricity by central stations in the United States will run close to \$1,300,000,000 this year. The very reliable *Electrical World* makes that estimate. The total sales of electricity for the first six months this year were \$649,300,000, which was 19.5 per cent more than the \$542,000,000 received in the first six months of 1922. In the first six months this year electrical companies issued in excess of \$600,000,000 in stock, bonds and notes to obtain capital for extensions and betterments of generating plants and transmission lines. As I said, electrical companies are putting more than a billion dollars a year into extensions and improvements in an effort to keep up with the demand for more and more electricity.

Where is all this demand for electricity coming from? Is it sound? Will it last? Those are pertinent questions. Let us consider the three great markets that buy electricity. These three are electric lighting, electric railways, and electricity for power uses in industry, in mills and factories. The greatest demand for electricity is from the industries, although many persons erroneously believe that the greatest market for electricity is for lighting homes and streets.

There were 24,351,676 homes in the United States when the 1920 census was taken. Of these only about 8% million homes are lighted by electricity. That leaves a great number of homes yet to be lighted by electricity. Of these, a large number are included in about 7 million farm homes, but quite a few millions of homes without electricity are city and town homes and daily many of them are becoming electricity users. Homes having electric lights generally have greatly increased their consumption of electricity by more artistic and better lighting. Bridge lamps and several colorful table lamps are common in almost every living room and parlor where a few years ago one single electric globe sufficed. The number of electric lights has been increased in every room in every modern home, be it bungalow or mansion. Added to this increase in illumination is the use of electricity for cooking, for operating washing machines and other home appliances and for ironing.

Electricity was first most largely used for lighting. Then electric railways developed and became the greater market for current. Today, however, factories and mills that use current for power are the greatest market for electricity. It is a tremendous new development that the public knows little of. I know one industrial plant whose electricity bill runs close to \$35,000 a month.

But there is still another development in the electrical industry that every investor and prospective investor should appreciate. It is "super-power," the interconnection of different electricity companies so that the greatest economy and efficiency in producing and distributing current can be brought about. A few years ago this interconnection was impracticable because the industry did not know how to handle high voltages economically. Current is most cheaply transported on high voltage lines. Improvements, largely in insulation, have made it practicable to transport high voltages economically considerably more than a hundred miles and thus greatly increase the efficiency of generating plants. A few years ago, no matter how much current it could produce, a plant was limited in its "output" because it could not transport electricity a long distance. Now all that has been worked out and interconnection between plants hooks up many states.

It is impossible to portray in this short space all the great picture of "super-power" and interconnection. One little advantage of this development will indicate its great importance and usefulness. Water power electric plants usually have two extremes in production of current. Low water and flood may both cut down the current producing by the hydro-electric plant. In such a situation a hydro-electric plant might not be able to serve all its customers. In many cases interconnection solves that difficulty. The current simply is drawn from some steam power electric plant perhaps a hundred or more miles away. Likewise, when the water-power plant is operating at full capacity the distant steam plants can cut down on the use of coal by drawing current through their interconnection with the water-power plant.

I mention only a few salient points to indicate the sound field of the electrical industry. Any business that has as large a usefulness and demand cannot but be fundamentally sound. Would I advise physicians to buy electric light and power bonds? I wouldn't advise anybody to buy anything. Every man's investment requirements are different from those of every other man or woman. A person's income, obligations, dependents and many other conditions should be carefully considered and his investments be made to fit that situation. I write this only to suggest that anyone with something to invest consider the electrical industry. There are other utility bonds and industrial bonds just as safe and desirable as the best electric light and power bonds. All should be considered and the investor should keep their characteristics in mind so that he may diversify his investments, not put them all in one enterprise. My suggestion is not to buy electrical industry bonds, or any bonds or stocks without first consulting an honest, established dealer in securities. It is the greatest essential in making sound investments.

## OBITUARY

### DR. LUTHER EMMETT HOLT

Dr. L. Emmett Holt, who died in Peking, China, on January 14, 1924, will perhaps be longest remembered as the author of a book, "The Care and Feeding of Children," which, through twelve editions, has been for twenty-five years an authority in the homes, not only of the United States, but of South America and Europe, and in China and Japan, where it has been invaluable in medical missionary work.

Recognized as a physician of the highest rank and standards, his influence with his profession was invaluable in removing doubts concerning the value of popularizing health education. After the Child Health Organization program had grown up under his stimulating leadership, he enthusiastically joined with several directors of the American Child Hygiene Association, of which he had formerly been president, in bringing about an actual consolidation of these two great organizations in the American Child Health Association, of which Secretary Herbert Hoover is the president, and of which Dr. Holt served as first vice president from its beginning.

Dr. Holt was born on March 4, 1855, at Webster, N. Y., was graduated from the University of Rochester in 1875, took his master's degree three years later, and, in 1880, was graduated from the College of Physicians and Surgeons of Columbia University. Later, when his work had brought him fame, he received the honorary degrees of LL.D. from Rochester, and Sc.D. from Columbia and Brown Universities.

Dr. Holt's activities covered a wide field, but were devoted to a single interest. From 1890 to 1901, he was Professor of the Diseases of Children at New York Polyclinic, and from 1901, Clinical Professor in the Diseases of Children at the College of Physicians and Surgeons. At the time of his death, he was physician-in-chief at the Babies' Hospital, member of the Board of Directors and Secretary for the Rockefeller Institute for Medical Research, and Trustee of the University of Rochester. He was a member of the Association of American Physicians, retiring president of the American Pediatric Society, and a trustee of the New York Academy of Medicine.

He conducted important research on infant metabolism and was the author of a number of pediatric papers. His book on "The Diseases of Infancy and Childhood" has been the standard textbook in pediatrics in the medical schools of the country.

Though nearly seventy years old, he went to China in August, 1923, as special lecturer at the Union Medical College in Peking, an institution maintained by the Rockefeller Foundation. His death is a loss, not only to the nation, but to the world, whose children he made it his mission to save and serve.

### DR. O. S. CHAPMAN

Dr. Ozias S. Chapman, one of the oldest physicians in Minneapolis, died Tuesday, February 5, 1924, at his home, at the age of 84 years.

During the Civil war Dr. Chapman had charge of a large military hospital at Cincinnati. He was a member of the George Rawlins post of the G. A. R., a member of the Hennepin County Medical Society, the Minnesota Medical Association and the American Medical Association and was active in the work of the Congregational church.

Dr. Chapman was born in Niagara Falls, New York, on March 11, 1839. He received his primary and high school education at Lockport and came to the West when he was 18 years old. For a time he studied at the University of Minnesota, but his education was interrupted for some time by the Civil war. He was graduated by the Miami Medical college at Cincinnati and in 1867 moved to Kansas City, where he remained until 1873. In that year, because of poor health, he moved to Massachusetts, where he continued in practice until 1879. Later he went abroad and upon his return settled in Minneapolis in 1881.

Surviving are his widow, Mrs. Adelaide C. Hayward Chapman, two brothers, Edmund G. Chapman of Duluth, and Arthur A. Chapman of Pueblo, Colo.; two sisters, Mrs. M. L. C. Dunn and Miss Angeline Chapman, Minneapolis, and a niece, Miss Letah Chapman.

### DR. H. B. CROMMETT

Dr. H. B. Crommett died February 6, 1924, at his home, Amery, Wis. Dr. Crommett is a graduate of the Medical College, University of Minnesota, in the year 1896. He first located at Montevideo, Minn., and in 1900 removed to Amery, Wis., where he had since practiced his profession.

## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

### STATE MEDICAL MEETING

The annual meeting of the State Medical Association will take place October 8-10, 1924, at St. Cloud. The program committee consisting of the chairman and secretary of the Surgical Section, Dr. A. C. Strachauer, Minneapolis, and Dr. V. C. Hunt, Rochester, the chairman and secretary of the Medical Section, Dr. E. L. Tuohy, Duluth, and Dr. C. N. Hensel, St. Paul, and the secretary of the Association, had its first meeting February 13. The various problems in the arrangement of a comprehensive program were discussed. It was decided to arrange a program similar to previous state medical programs, affording an opportunity for members of the Association to present subjects in which they are particularly interested and which will be of interest to the members. Members are invited to send in to the secretary of the Association, 402 Guardian Life Bldg., St. Paul, the titles of subjects they desire to present. It will of course be incumbent on the committee to pick and choose in order to make up a well balanced program. Titles must be in the hands of the secretary by April 15. Prompt notification of acceptance or rejection will be made about May 15.



## HENNEPIN COUNTY MEDICAL SOCIETY

Under the auspices of the Alpha Xi chapter of the Phi Delta Epsilon fraternity of the University of Minnesota, Dr. Morris Fishbein, a member, and associate editor of the Journal of the American Medical Association and of Hygieia, will speak at the regular Wednesday noon meeting of the Hennepin County Medical Society, March 19, 1924, in the library rooms in the Donaldson Bldg., on the subject of "Preparation of a Medical Manuscript." In the evening of the same day, and at the same place, Dr. Fishbein has consented to speak more formally and at greater length on the subject of "Medicine and the Press." This topic will be discussed by members of the medical and newspaper press. These meetings will be open to the medical profession in general.

## THE MINNEAPOLIS SURGICAL SOCIETY

The regular monthly meeting of the Minneapolis Surgical Society will be held Thursday, March 6, 1924, at the Minneapolis General Hospital. Operative clinics will be held by Dr. J. F. Corbett, Dr. E. C. Robitshek, Dr. Olson, Dr. Lynch, Dr. E. Moren, Dr. S. R. Maxeiner, and Dr. A. A. Zierold. A luncheon will be served at the hospital at 12:30 P. M. followed by a pathological conference.

A dinner will be served at the General Hospital at 6:30 P. M. followed by the presentation of cases and a paper by Dr. Angus Cameron, of the University of Minnesota, on "Luetic Bursitis."

## SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The annual meeting of the Southern Minnesota Medical Association will be held at Mankato, Minn., May 19, 1924. Members having papers they wish to present are asked to send the titles as soon as possible to the chairman of the program committee, Dr. H. W. Meyerding, Rochester, Minn. All communications regarding the program are also to be sent to Dr. Meyerding.

## OF GENERAL INTEREST

Dr. W. C. Portman, of Jackson, is spending the winter on the west coast.

A son was born to Dr. and Mrs. D. N. Berkman of Rochester, January 29, 1924.

Dr. B. L. Laver, of Guy's Hospital, London, is spending several months at the Mayo Clinic.

Dr. and Mrs. C. A. Rathbun of St. Cloud are receiving congratulations on the birth of a son.

Dr. Otto Aagaard of Dr. Rovsing's clinic in Copenhagen is spending a month in Rochester.

Dr. C. H. Patterson, Barnesville, has been elected chief of staff of St. Ansger's Hospital in Moorhead.

Dr. John A. Watson of Minneapolis is now medical and surgical counsellor at Mudbaden Sanatorium, Jordan.

Dr. Louis Faust, a Fellow in the Mayo Foundation, was married to Miss Elsie Eaton of Rochester on January 15.

Dr. C. J. Hutchinson, formerly of Rochester, has announced his connection with the Kenosha Clinic, Kenosha, Wisconsin.

Dr. H. F. Helmholz was elected President of the Northwest Pediatric Society at the meeting held in St. Paul on January 31.

Dr. and Mrs. D. E. Seashore of Duluth have just returned from Miami, Florida, where they have been for the past month.

Dr. and Mrs. J. A. Freeborn of Fergus Falls are now in New York City, where Dr. Freeborn is taking a post-graduate course.

Dr. A. W. Adson delivered the Joyce Memorial Lecture in Portland, Oregon, on February 14. His subject was "Trifacial Neuralgia."

Mr. Perrin C. Galpin, Secretary of the Commission for the Relief of Belgium, visited the Mayo Foundation the latter part of January.

Dr. and Mrs. Arthur Steen of Cottage Grove, left the early part of February for Los Angeles, where they will spend the remainder of the winter.

Dr. A. E. Baldwin, who recently completed his internship at Phalen Hospital, St. Paul, is now engaged in the practice of medicine at Brownsdale.

Dr. Thomas O. Young, formerly of the Mayo Clinic, Rochester, has established offices in Duluth for the practice of surgery and surgical diagnosis.

Dr. J. W. Snyder, formerly of Rochester, has announced the opening of offices for the practice of general and thoracic surgery in Indianapolis, Indiana.

Dr. William J. Greenfield, formerly a member of the Mayo Clinic, Rochester, is now engaged in the practice of eye, ear, nose and throat work in Minneapolis.

Dr. Frederick Van Valkenburg, who recently completed his course in medicine, is now associated in practice with his father, Dr. B. F. Van Valkenburg at Long Prairie.

Dr. T. J. Kinsella, formerly a Fellow in the Mayo Foundation, and later connected with the Nicollet Clinic, was married to Miss Sara Monahan at Cedar Rapids on January 28.

Dr. Homer F. Swift, of the Rockefeller Institute for Medical Research, spent February 19 and 20 in Rochester and gave a Mayo Foundation Lecture on "Rheumatic Fever."

Dr. O. H. Ternstrom, formerly of St. James, is now located in Minneapolis for the practice of medicine. Dr. F. L. Bregel succeeds Dr. Ternstrom in his practice at St. James.

Dr. Emanuel Libman, Professor of Clinical Medicine, Columbia University, who visited the Mayo Clinic in January, gave a Mayo Foundation Lecture on "Endocarditis," January 22.

Dr. and Mrs. J. W. Meighen, of Ulen, are in New Orleans, where Dr. Meighen is taking a post-graduate course in the treatment of diseases of the eyes, ears, nose and throat.

Dr. F. G. Kohler of Hector has associated with him in the practice of medicine, Dr. Elton H. Smith of Minneapolis, who recently completed his internship at St. Barnabas Hospital.

Dr. Theodor Bratrud, Warren, is now in Boston, where he is doing post-graduate work. He will also take a course of study in New York before returning to Warren some time in April.

Dr. H. W. Froehlich, Thief River Falls, has been appointed a major in the Medical Officers Reserve Corps of the United States army. Dr. Froehlich has been a captain in the reserve corps for the past five years.

Announcement has recently been made of the appointment of Drs. Reuben Johnson and M. N. Moss of Minneapolis, as temporary assistants in medicine and obstetrics respectively, at the University of Minnesota.

Dr. L. M. Brunet, a practicing physician in Cloquet and Duluth, for the past fifty years, has retired from practice in that vicinity and is now located in Detroit, Michigan, where he will make his home with a daughter.

Announcement has been received of the marriage of Dr. C. E. Anderson, formerly of Minneapolis, now a practitioner at Garretson, S. D., to Miss Grace P. Blake of Berlin, S. D., which took place at the home of the bride's parents January 15.

Dr. James K. Anderson, who has been in Pittsburgh for the past several months taking post-graduate work, has accepted the medical directorship of the Deerwood Sanatorium, Deerwood, where he entered upon his duties the latter part of January.

Dr. J. W. Andrews has severed his connections with the Mankato Clinic, of which he was one of the original founders, and will spend the winter on his fruit ranch in Florida. Dr. Andrews on his return to Mankato will resume his private practice.

Dr. Ogawa, Dean of the Medical School of the University of Kyoto, and Dr. Toda, of Okayama Medical University, who are making a survey of the principal medical schools of America and Europe, spent February 14 visiting the Mayo Foundation and Clinic.

Dr. B. C. Bernard, formerly a member of the staff of the Deerwood Sanatorium, is now superintendent and medical director of the Oakland Park Sanatorium, Thief River Falls, succeeding Dr. M. George Milan, who is now a staff member of the Warren hospital.

Dr. F. C. Schlutz, Minneapolis, has been appointed chief of the Pediatric Department and Professor of Pediatrics at the University of Minnesota Medical School on a full time basis. He will replace Dr. Rodda, who was appointed temporarily on resignation of Dr. Pirquet, who returned to Vienna.

Dr. and Mrs. W. J. Mayo left the first of February for

New Zealand and Australia. Dr. Mayo will attend the meeting of the Australasian conference of the British Medical Association in New Zealand, and will spend about six weeks visiting the various hospitals and universities in those countries.

Dr. E. Z. Shapiro of Duluth, in company with Dr. Charles Giesen of Superior, left February 6 for Vienna, where he will engage in research work. Dr. Giesen began his research work during the year 1914 but with the advent of the war was forced to return to this country. Both physicians will study at the University of Vienna.

"The Child Health Magazine" is the new name of the official publication of the American Child Health Association, which was formerly published under the name of "Mother and Child." The first issue of the new magazine, which is double the size of the former journal, appeared January 1, 1924. The magazine in its new form has an attractive typographical appearance and is fully illustrated.

Benjamin Franklin spent much time in England from 1757 to 1762 representing the American colonies. While there he placed one hundred pounds in the hands of members of the Society of Friends as a trust, to be invested with accumulations, for not less than one hundred and fifty years. Thereafter at the discretion of the trustees, awards were to be made from time to time for the most valuable contributions to science considered by them, either manuscript or published, on the subject of cures, but particularly in relation to surgery, the nervous system and the part "Mind Treating" has in the recovery and preservation of health. Announcement is now made of the first awards of this fund. *Minor award*, Fusakichi Omori of Tokio, unpublished treatise, "The Rotary Knife in Surgery," five hundred pounds and publication of treatise. *Award*, Charles P. Steinmetz of Schenectady, privately published treatise, "The Nervous System as a Conductor of Electrical Energy," one thousand pounds and republication of treatise. *Major award*, Pierson W. Banning of Los Angeles, published work, "Mental and Spiritual Healing; All Schools and Methods; A Text Book for Physicians and Metaphysicians," two thousand five hundred pounds, scholarship.

## NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

### ABBOTT LABORATORIES:

Potassium Bismuth Tartrate-D. R. L.  
Ampules Potassium Bismuth Tartrate with Butyn-D. R. L., 0.1 gm.  
Ampules Potassium Bismuth Tartrate with Butyn-D. R. L., 0.2 gm.

### BRITT, LOEFFLER AND WEIL:

Loeffler's Malt Soup Stock (Dr. Keller's Formula)

### HYNSON, WESTCOTT AND DUNNING:

Flumerin-H. W. and D.

LEDER

Corp

Corp

Ova

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PARK

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## LUDERLE ANTITOXIN LABORATORIES:

Corpus Luteum-Lederle  
Corpus Luteum Extract-Lederle  
Ovarian Residue-Lederle  
1 Per Cent Silver Nitrate Solution-Lederle  
Whole Ovary-Lederle

## PARKE, DAVIS AND CO.:

Ergot Aseptic  
Ampules Ergot Aseptic, 1 c.c.  
Scarlet Red Sulphonate-P. D. and Co.  
Scarlet Red Emulsion, 4 per cent-P. D. and Co.  
Scarlet Red Ointment, 5 per cent-P. D. and Co.  
Scarlet Red Ointment, 10 per cent-P. D. and Co.

## NEW AND NON-OFFICIAL REMEDIES

**Potassium Bismuth Tartrate-D. R. L.**—A basic potassium bismuth tartrate containing from 64 to 69 per cent of bismuth. For a discussion of the actions and uses, see Bismuth Preparations in the Treatment of Syphilis (Jour. A. M. A., Aug. 25, 1923, p. 661). Potassium bismuth tartrate-D. R. L. is supplied only in the following forms: Ampules potassium bismuth tartrate with butyn-D. R. L., 0.1 gm. (containing potassium bismuth tartrate-D. R. L., 0.1 gm. suspended in 2 c.c. of a 0.6 per cent solution of butyn in a fixed oil); ampules potassium bismuth tartrate with butyn-D. R. L., 0.2 gm. (containing potassium bismuth tartrate-D. R. L., 0.2 gm. suspended in 2 c.c. of a 0.6 per cent solution of butyn in a fixed oil). The product is administered intramuscularly. The Abbott Laboratories, Chicago.

**Scarlet Red Sulphonate.**—The sodium salt of azo-benzene-disulphonic-acid-azobetanaphthol. The actions and uses of scarlet red sulphonate are essentially the same as those of scarlet R medicinal Biebrich (see New and Non-official Remedies, 1923, p. 275). It is marketed only in the following forms: Scarlet red emulsion, 4 per cent-P. D. and Co., scarlet red ointment, 5 per cent-P. D. and Co., scarlet red ointment, 10 per cent-P. D. and Co. Parke, Davis and Co. Detroit. (Jour. A. M. A., Jan. 19, 1924, p. 209.)

**Ergot Aseptic.**—A liquid extract of ergot containing the soluble constituents of the drug. It is standardized biologically so that 1 c.c. represents 2 gm. of ergot. The actions and uses of ergot aseptic are the same as those of ergot. The dose is 1 to 2 c.c. injected intramuscularly. Ergot aseptic is marketed only in 1 c.c. ampules. Parke, Davis and Co., Detroit.

**Loeflund's Malt Soup-Stock (Dr. Keller's Formula).**—A preparation essentially similar to extract of malt, U. S. P., but containing a small amount of potassium carbonate. Loeflund's malt soup stock is designed for use in preparing the malt soup of Dr. Keller. Britt, Loeffler and Weil, New York. (Jour. A. M. A., Jan. 26, 1924, p. 303.)

## PROPAGANDA FOR REFORM

**Intarvin.**—Because of numerous inquiries, the Council on Pharmacy and Chemistry publishes a preliminary report on Intarvin. The product is marketed by the Intarvin Company, Long Island City, N. Y. Dr. Max Kahn has applied for a patent on it. Many statements have been

given the lay press by those interested in the promotion of Intarvin, but as yet no publication has appeared in the medical press, except preliminary reports by Kahn. Intarvin is proposed for use in diabetes or in conditions where acidosis occurs. It is a synthetic fat which, it is claimed, can be assimilated by the diabetic without the production of products that cause acidosis, as is the case with ordinary fats when these are consumed by diabetics. Intarvin is stated to be the glyceryl ester of margoric acid admixed with ten to twelve per cent of liquid petrolatum. While the usefulness of Intarvin is curtailed by the discovery of insulin, it should be valuable in planning a diabetic diet if the claims made for it are substantiated. Intarvin is still in the experimental stage and it is unfortunate that so much newspaper notoriety has been given it. Until acceptable evidence is available for its usefulness, palatability and practicability, judgment of its worth must be suspended. (Jour. A. M. A., Jan. 5, 1924, p. 51.)

**Firma-Chloro.**—Firma-Chloro is marketed by the Chloro Chemical Corporation. According to the label, it is a mixture of chlorinated lime, tincture of iodine, picric acid, potassium chlorate, sodium bicarbonate and glycerin, but the amounts of the ingredients are not declared. The preparation is claimed to be a powerful chlorinated disinfectant. It is alkaline in reaction, hence the iodine which is claimed to be present would be converted to sodium iodide and sodium iodate. Altogether, the claimed formula is an impossible one: Firma-Chloro is another example of an irrational antiseptic. The favorite method of introducing Firma-Chloro is much like that used for "Oil of Salt" (which the A. M. A. Chemical Laboratory found to be essentially a mixture of linseed oil and essential oils, including turpentine, camphor and sassafras), namely, sending letters to manufacturing plants importuning them to have the product used in the first aid or medical department. (Jour. A. M. A., Jan. 5, 1924, p. 53.)

**Chemical Foundation Wins.**—During the late war, our government seized many German patents on synthetic drugs. Later the Alien Property Custodian, on executive order of President Wilson, sold 4,700 German chemical patents to the Chemical Foundation, Inc. This corporation agreed in turn to license any American firm that could present evidence of reliability in chemical manufacture to manufacture under these patents. As a result of this action, physicians may today obtain different brands of arsphenamin instead of one proprietary "Salvarsan"—and at competitive prices. The same is true of other useful synthetics. About a year and a half ago, President Harding instructed the Alien Property Custodian to take steps to secure the return of all patents sold to the Chemical Foundation, Inc., on the ground that the price paid was inadequate and the transaction illegal. Suit was instituted by the government against the Chemical Foundation, Inc., for the recovery of the patents. The suit was won by the Chemical Foundation, Inc. In the decision of the court, it was held that the price was adequate, for the reason that many of the patents were non-workable and that, therefore, because of the financial risk and hazard, the value of the patents "was too slight and problematical to warrant the payment by American citizens of a sum even remotely

approximating what they might have been worth to the German owners for their monopolistic purposes." Hence, the bill of complaint filed by the government was set aside. (Jour. A. M. A., Jan. 12, 1924, p. 130.)

**Case's Rheumatism Cure.**—Some years ago, Jesse A. Case was exploiting "Case's Rheumatic Specific" and an adjunct, a "Liver Tablet." This was a fraudulent mail-order quackery and was finally put out of business by the Post Office Department. Now, Paul Case, son of Jesse A. Case, advertises in newspapers that he has a wonderful rheumatism prescription which he is willing to give free. Those who write receive prescriptions which are strikingly similar to the preparations used by Jesse A. Case. However, the prescription of Paul Case starts out with a "Joker" that was not in the prescription of his father. This is "Powdered Gadoeng (Java)." When sending the prescriptions, Case states that best results are obtained with Genuine Gadoeng—and offers to supply the remedies at a moderate price. Gadoeng is a name for *Dioscorea hirsuta* (a plant related to the obsolete American drug, Wild Yam), which grows in Java and is not found in drug stores. Hence, druggists cannot fill the prescription, and those who want the medicine must get it of Case. (Jour. A. M. A., Jan. 12, 1924, p. 145.)

**The Action of Salicylates, Cinchophen, Neocinchophen and Related Products.**—The latest (1923) edition of Useful Drugs speaks of the salicylates, cinchophen, neocinchophen and related drugs as "highly efficacious" and "exceptionally efficient" in the management of certain phases of arthritis. The assumption that the drugs exert an etiotropic action by destroying bacterial agencies responsible for the disease has repeatedly been disproved. They do not function as germicides, for example, in rheumatic fever assumed to be caused by micro-organisms. Recently, Hanzlik and Painter compared the antiphlogistic effect of salicylates, cinchophen and neocinchophen in experimental edema of head and neck. They concluded that the so-called antiphlogistic action of these drugs as exemplified in the prompt amelioration of objective signs of inflammation, including the swelling and edema of the joints, is not due to a direct action on the inflammatory process. Experimental edema of the head and neck in animals was not beneficially influenced by previous and simultaneous treatment of the animals with sodium salicylate, cinchophen, or neocinchophen. Negative results with respect to antiphlogistic effects have also been observed in the treatment of other kinds of edema. Consequently, it is concluded that the beneficial effects of these drugs in rheumatic fever appear to be produced neither through etiotropic nor organotropic, but rather through symptomatic action, the benefits being mediated through antipyresis and analgesia. (Jour. A. M. A., Jan. 19, 1924, p. 213.)

**Diphtheria Antitoxin for the Infant.**—In the presence of diphtheria, no age is a contraindication to the administration of antitoxin. The dose for infants of from 10 to 30 pounds and under two years of age has been given as from 2,000 to 10,000 units. The immunity to diphtheria in young infants seems to depend on antitoxin received from the mother through the placental circulation. This immunity is possessed by more than 90 per cent of the children in

the early weeks of life, but at the end of a year this has been lost by about half of them. Serums are well borne by young children, as they have little sensitiveness to foreign proteins. A suitable immunizing dose of diphtheria antitoxin for an infant would be from 200 to 500 units, and the therapeutic dose from 2,000 to 10,000 units. (Jour. A. M. A., Jan. 19, 1924, p. 228.)

**Dermatosis From Fur.**—Reports have been published of persons who have suffered severe eruptions and irritations of the skin following the wearing of furs. Investigation has shown that these disturbances are caused by paraphenyldiamin, which is used to dye furs black, and by quinone, an oxidation product of paraphenyldiamin, which gives a brown color. The untoward effects may be prevented largely by extreme care in the finishing and dyeing processes, with special attention to remove all excess dye, and particularly traces of quinone from the fur. (Jour. A. M. A., January 26, 1924, p. 307.)

**Spectro-Chrome Therapy.**—Colonel Dinshah P. Ghadiali is the exponent of "Spectro-Chrome Therapy" and founder of the "Spectro-Chrome Institute." According to a "life sketch" sent out by him, he was born in India, attended a primary school when he was 2½ years old, was in high school when he was eight years old and at the age of 11 acted as assistant to a professor of mathematics and science at Wilson College, Bombay. Since then he claims to have had a remarkable and varied career. "Spectro-Chrome Therapy," we are told, is "The Latest Revelation in the Healing Art." It consists in "the restoration of the healing Radio-Active and Radio-Emanative Equilibrium by Attuned Color Waves." Here is the thesis developed and commercialized by Ghadiali: Every element exhibits a preponderance of one or more of the seven prismatic colors; 97 per cent of our body is composed of the four elements, oxygen, hydrogen, nitrogen and carbon. The preponderating color waves of these four elements are blue, red, green and yellow, respectively; the human body is responsive to these four "color wave potencies." In health our four colors are properly balanced. When they get out of balance we are diseased; ergo, to cure disease, administer the lacking colors or reduce the colors that have become too brilliant. These cures are to be produced, of course, by means of paraphernalia which Ghadiali supplies. He gives a course in "Spectro-Chrome Therapy." At the end of the course, which seems to last two weeks, a diploma is granted. That this "cult" is taken seriously by some is shown by the published testimonials of cures said to have been wrought. Hopeless and credulous patients are being treated for such serious conditions as syphilitic conjunctivitis, ovaritis, diabetes, neuritis, pulmonary tuberculosis and chronic gonorrhea, with colored light. (Jour. A. M. A., Jan. 26, 1924, p. 321.)

**Effect of Bromids on Epilepsy.**—The harmful effects of the prolonged administration of bromides aside from the skin and intestinal effects, are gradually increasing dullness, heaviness, torpor, stupidity, with greater self-centering of interests and unintelligence. The size of the dose that is necessary to control the fits is probably an important factor in determining the amount of damage that will be done. (Jour. A. M. A., Jan. 26, 1924, p. 325.)

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# PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

MEETING OF JANUARY 9TH, 1924

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, January 9th, 1924, at 8 p. m. Dr. H. P. Ritchie, Vice President, presided. There were 22 members and 1 visitor present.

Prof. R. E. Scammon was elected to honorary membership in the Academy.

The following members reported cases:

1. Dr. C. E. Riccs (St. Paul): Preliminary remarks. For forty years I have met at different times three grave infections of the central nervous system—epidemic cerebrospinal meningitis, infantile paralysis and encephalitis lethargica. The latter name, given by Economo, is unfortunate because 20 per cent of the cases are not lethargic. These three infections have one thing in common: they occur sporadically. For twenty-five years I was on the staff of the City and County Hospital and every spring I expected to see, and was not disappointed in seeing, sporadic cases of cerebrospinal meningitis. I had a similar experience with infantile paralysis and the same is equally true of epidemic encephalitis.

I wonder how much any of us know of the occurrence of epidemic cerebrospinal meningitis fifty or sixty years ago. I recall hearing an old practitioner tell his experience; he and a confrère were practicing in northwestern Ohio and for three weeks during an epidemic he did not have his clothes off. He bled his patients; his confrère purged him; and about the same number died in each instance.

These three diseases have their periods of epidemic influence and it is during the interim that the sporadic cases occur. I think it is pretty well established that as far as two of these infections are concerned—epidemic cerebrospinal meningitis and infantile paralysis—the microbic agent is known. The disease called Australian X is clinically and histologically similar to that of infantile paralysis, and according to Flexner is "an exalted form of epidemic poliomyelitis," but when it comes to encephalitis lethargica, as to the microbic agent the bacteriologists are still at sea.

The most notable work in this line has perhaps been done by the members of the Sinai Hospital staff. They believe they have produced experimental encephalitis and that the globoid organism that they have observed is the inciting cause. These findings, according to Flexner, have never been confirmed except by Thalheimer of Milwaukee. Levaditi and Harvier, McIntosh and Turnbull, Doerr and an associate, Schnabel, have, they believe, experimentally produced encephalitis. Experiments, however, carried out by Flexner and Amoss for a period of four years "failed constantly to yield an unequivocal result."

Febrile herpes may cause an infection that manifests characteristics very similar to those of experimental encephalitis. Expert bacteriologists postulate an identity

between the two processes. While it would appear that laboratory workers are at variance regarding the etiologic agent that causes epidemic encephalitis and the solution of this problem is not yet an accomplished fact (Flexner), the disease is still with us. Its symptomatology is startlingly protean, exceeding that even of syphilis. Last winter we experienced in the Twin Cities a serious epidemic. This year it appeared much earlier (I observed my first cases in October). It is most atypical and most virulent. In one of my patients it simulated an involuntional melancholia and in another it grafted itself on an essential epilepsy, this patient dying with a temperature of 108 degrees.

This evening I wish to report a case of a disorder of personality, arising in one of my patients, suffering from encephalitis lethargica.

Miss E., 17 years. Mother died of pulmonary hemorrhage; father living and well; three brothers and one sister died in infancy; one brother and one sister living and well. Infantile paralysis at 10 years; recovered in five months. Shortly after she developed Sydenham's chorea. This lasted three months. Seven years ago she had an attack of acute articular rheumatism. Has been nervous at times ever since. At these periods it has been difficult to talk. Had an attack of lethargic encephalitis one year ago last spring; was in bed three weeks; was markedly lethargic; would arouse if spoken to, stay awake 15 minutes or so and again fall asleep. Ten days ago tremor was first noticed in right arm; this extended to the right leg, then to the left arm and leg. When she consulted me she was apathetic, took no interest in things and was unable to concentrate mentally. Last June she developed nervous spells, complained of feeling faint; apparently would drop off to sleep; breathing short and quick. If hands or feet were lifted they would fall back as if lead. No change in color in face. These seizures lasted from 20 minutes to several hours in duration. The attacks varied in frequency from one to three in 24 hours and usually occurred on afternoons. Occasionally the seizures would occur in the early afternoon and continue during the night. She would hold her breath in some spells for two minutes; sometimes she would start talking as soon as the attack came on and might continue doing so for three or more hours until the spell passed off. In her conversation she described in detail journeys she never made (fabrications); again she would imagine that she was at a hospital at the front, where she was assisting the doctors and nursing shell-shocked soldiers. Then again she would think of herself as a missionary and would tell Bible stories; she would also quote passages from the Bible and tell where such passages would be found. Her citations as to the passage and place were correct. During these attacks she would frequently hold her hands to her ears and would cry out in terror, "there is another shell," and tremble all over. Then she would fold her hands in prayer, praying for the soldiers and herself. Frequently she would narrate occurrences that had occurred in her own life and usually her descriptions were accurate. This patient was fond of basket-ball and during some of the attacks she was evidently witnessing a game. She would first tell the names of the players; if her friends won a score she would clap her hands vigorously, talking constantly; if they lost she showed her great disappoint-

ment. At times during the progress of the game she would give utterance to the high school yell. Generally in coming out of an attack she would twitch and shake all over. There was no recollection of what she said or did during an attack with the exception of the last few spells, of which she had a confused memory. At times one or both legs would draw up; the leg flex on the thigh and the thigh flex on the abdomen. Occasionally, the arms and legs and whole body would become rigid. At these times she would hold her breath and the right leg would be extended and rigid.

Physical examination showed aortic and mitral insufficiency, moderate myocardial insufficiency and moderate dilatation to the left. There was a mild residual arthritis of wrist, ankle and knee joints.

The neurological examination was negative. Hemoglobin 88 per cent. Blood pressure 130 systolic, 80 diastolic. Urine negative. Serological findings negative. She experienced marked relief after the first lumbar puncture, the attacks greatly diminishing. After an intraspinal injection of auto serum, they were much increased for a week; then practically ceased.

Clearly, this is a case of encephalitis lethargica, with an associated disorder of personality. For the latter, for the want of a better name, we use the archaic term hysteria. Recently Hunt has called attention to this rather unusual association. Hysteria, neurasthenia, and psychasthenia—the so-called psychoneuroses—are not diseases, only syndromes, clinical ensembles as it were, due to the influence of mental stress, physical illness or both on personality—they tend to disintegrate, to disorder it; in fact, the whole gamut of nervousness or nervous manifestations are just so many expressions of their disruptive effect on its normal integration. The functional nervous diseases of forty years ago and the psychoneuroses of a later evolution are now in the discard. They have been touched by the magic wand of the new psychology and are no more—we now marvel at the immaturity of our former concepts.

In the disorders of personality we now find a scientific, a more satisfactory explanation. The struggle of personality within itself, i.e., the inherited instincts versus our acquired experiences; its struggle with the industrial, the social and the moral order; its inherent initial defects; the disruptive influence of mental stress or grave physical illness, or both combined; these constitute the ordeal through which personality in the making must pass in order to become stabilized and normal and it is while passing through this crucible that all these protean nervous and mental symptoms arise. Goethe truly says:

"Two souls, alas, reside within my breast,  
And each from the other rends and tears itself."

## 2. DR. A. C. STRACHAUER presented two cases:

(a) A case of chronic indurated gastric ulcer present since the age of 8 years, treated by excision and posterior gastroenterostomy.

Norvald N., age 11 years.

Complaint: Epigastric pain, nausea, vomiting, and undernourishment.

History: Patient admitted to the University Hospital on Nov. 14, 1923, complaining of epigastric distress, nausea,

vomiting, and loss of weight and strength. Symptoms had developed suddenly three years ago, and consisted of severe epigastric distress coming on about 2 hours after eating, followed in half to three-quarters of an hour later by nausea and vomiting. Vomiting always gave complete relief. Such symptoms might occur as often as twice daily or be absent for several days. The patient found nothing which would relieve the pain except emptying the stomach. Periods of such attacks occurred intermittently but with increasing frequency. The longest interval of freedom from distress since the onset of his illness was 5 weeks. Gradually he began to lose weight. His appetite became poor; he felt weak and listless, and finally was taken from school. Six months ago the pain began to subside. Vomiting persisted and occurred every two or three days. The parents noticed that food eaten the day previous would often be vomited the next day. He continued to lose weight and strength. He had never vomited blood nor, as far as can be ascertained, passed blood in the stools.

Examination at the time of entrance showed an emaciated, under-developed boy, weighing 43 pounds, with no abnormal physical findings except very carious teeth, moderate cervical adenopathy and epigastric distention, in which peristaltic waves could be plainly seen moving across the abdomen to the right. Abdominal palpation negative.

Fluoroscopy of the stomach showed enormous dilatation, atony and complete retention of the barium meal at the end of 6 hours. Findings were conclusive for pyloric obstruction, but did not differentiate between ulcer or congenital stenosis.

While in the hospital he had no fever. He complained of no pain, but unless aspirated daily he refused his food because of a feeling of distention. Routine aspirations each morning varied from 600 to 1,300 c.c. Retention was not relieved by milk and cream diet with acidity controlled by alkalies. Patient gained three pounds while in the hospital.

## Laboratory findings:

### Gastric content:

Free acid varied from 14 to 35 points.

Combined varied from 37 to 56 points.

### Urine—normal.

Stools showed no occult blood.

Hemoglobin, 90 per cent.

Leucocyte count, 10,700.

Polymorph., 79 per cent.

Lymphocytes, 12 per cent.

Wassermann negative.

Von Pirquet negative.

## Pre-operative diagnosis:

1. Ulcer.
2. Congenital pyloric stenosis.

Treatment: Ether anesthesia. The abdomen was opened by a right rectus incision, disclosing the stellate scar of a gastric ulcer, the size of a dime, on the anterior wall of the stomach, three-quarters of an inch from the pylorus. On palpation a crater could be felt which readily admitted the tip of the little finger. The stomach wall, over an area the size of a quarter, was markedly thickened.

The ulcer was excised, being one centimeter in thickness, and because of almost complete obstruction at the pylorus a posterior gastroenterostomy was performed.

**Pathologist's report:** Gross specimen consisted of an excised area of stomach wall measuring  $2\frac{1}{2} \times 2\frac{1}{2} \times 1$  cm. in thickness. It showed an induration of stomach wall consisting of firm, fibrous connective tissue. The mucosa showed a definite crater-shaped ulcer measuring  $5 \times 7$  mm.

**Microscopic report:** Section of the ulcer showing the thickened stomach wall to be made up of dense fibrous connective tissue with very small blood vessels. This tissue contained a few lymphocytes. The mucosal surface showed a break in continuity corresponding to the area of ulceration described in the gross. **Diagnosis:** Gastric ulcer. (John F. Noble, M.D.)

**Subsequent history:** Patient made an uneventful recovery and was sitting up on the tenth day after operation.

(b) A case of hydronephrosis in infancy.

**Elmer D., age 16 months.** Complaint: Abdominal tumor and dyspnea.

**History:** The patient, a well-developed, well-nourished male infant, was admitted to the University Hospital on December 4, 1923. He weighed 26 pounds, and, except for the abdominal swelling and dyspnea, was apparently in excellent health. Delivery was normal; he was breast-fed for four months. Teeth erupted at normal intervals, and he began to walk at one year. The abdomen was unusually large at birth, and it gradually increased in size. At one year, when he began to walk, dyspnea was noticed. At the same time the swelling became more prominent on the left side and for the first time a soft, fluctuant mass was made out. This became uniformly larger, until at the time of his entrance to the hospital it occupied almost the entire left side of the abdomen. It was never painful. There were no abnormal urinary symptoms.

**Examination:** A large, soft mass occupied the entire left side of the abdomen from the costal margin to the brim of the pelvis. It imparted a definite fluid wave and moved toward the midline when the abdominal muscles were used. Circumference of the abdomen at the umbilicus was 24 inches, and the same at a level 2 inches higher. A cystic, elastic tumor mass could be felt by rectal palpation. Examination otherwise negative.

**X-ray examination:** Fluoroscopic examination of the colon showed the splenic flexure and descending portion to be markedly displaced to the right, toward the midline.

**Laboratory findings:**

Urine normal.

Hemoglobin 70 per cent; red cells 3,640,000; leucocyte count 7,200.

Wassermann negative.

**Clinical diagnosis:**

1. Congenital hydronephrosis.
2. Mesenteric cyst.

(Because of the patient's age and sex it was not deemed advisable to submit him to cystoscopy and pyelograms. Cystoscopic examination in girl infants is easily performed, but boy infants are liable to traumatization and are to be cystoscoped only under the greatest urgency.)

**Treatment:** Ether anesthesia. Left rectus incision. The descending colon was mobilized, and an enormous hydronephrotic kidney removed by the transperitoneal route.

**Pathologist's report:** The specimen consisted of a large hydronephrotic kidney. The entire specimen measured  $17 \times 13 \times 11$  cm. The kidney was flattened and thin to form part of the wall of the dilated pelvis and was  $16 \times 9$  cm. The ureteral pelvic juncture was located at the medial border of the mass and slightly anterior. There was a definite constriction at this point. The dilated pelvis was vascular and the renal vessels entered at the medial border and ran adherent to the wall of the sac to reach the kidney.

**Subsequent history:** The patient made an uneventful recovery and was discharged from the hospital 16 days after operation. At the time of his discharge the abdomen measured 21 inches in circumference at the level of the umbilicus.

**Comment:** Congenital hydronephrosis is still rare enough to be of interest when found. A review of the literature discloses 120 reported cases. Approximately three-fourths of the cases are discovered soon after birth, and as time passes the cases which are encountered are less likely to be of true congenital origin.

Most of the reported cases have been unilateral. Stricture of the ureter has been a common cause. The locations of the strictures are at three principal sites: the ureteral pelvic juncture, the level of the brim of the pelvis, and at the ureteral vesical orifice. Twenty to forty per cent of strictures, varying with the series reported, are at the ureteral pelvic juncture and the remainder are at the lower end of the ureter, most commonly at the ureteral vesical orifice.

The following pathological findings have been reported:

1. The presence of fetal folds persisting to form valves or actual constrictures of the ureter.
2. Anomalous vessels causing kinking of the ureter to produce obstruction.
3. Intrauterine inflammatory reactions causing fibrous strictures.
4. Failure of development of all or part of the ureter. (Engel has reported 8 cases in which one or both of the ureters are entirely absent.)
5. Anomalous positions of the ureter entering the vagina, uterus or bowel.

There have been a few cases of probable congenital origin in which hydronephrosis and hydroureter have been found without constriction at any point. The etiology of such conditions has been explained by

1. Disturbance of nervous mechanism in which there is a spasmodic contraction of the internal vesical sphincter occurring coincidentally with powerful contraction of the bladder and resulting in back pressure in the ureter and pelvis of the kidney.
2. Inflammatory reaction with erosion of the ureteral vesical orifice destroying the valve action and allowing back pressure from the bladder.
3. A congenital failure of the development of ureteral musculature.
4. Congenital hydronephrosis must be differentiated most

commonly from mesenteric cyst, ovarian cyst, enlarged spleen, pancreatic cyst and megacolon.

Symptoms consist of abdominal swelling in which a definite mass can usually be made out. Frequency, painful micturition or retention are occasionally found, and in such cases the stricture causing the hydronephrosis is usually at the ureteral vesical juncture. Bottomley reports 17 cases in which a fibrous constricted ureteral vesical orifice projected several mm. into the bladder. All of these cases show some bladder symptoms.

Where cystoscopy, ureteral catheterization and pyelograms are feasible, as in female infants, a positive diagnosis can usually be made.

The transperitoneal route has been the favored method of approach.

In cases of bilateral hydronephrosis, some form of plastic operation must be attempted, but the prognosis in such cases is very poor.

#### DISCUSSION

DR. A. SCHWYZER: In connection with the case of congenital hydronephrosis, I thought of a case that was very interesting in the obstetric service which I saw when I was assistant in the University Hospital in Zurich. When I was called in to see the case the second assistant had pulled out the arm of the child when he tried to make a version, and he had torn the arm and shoulder-blade clear off. The arm was edematous. I told him right away it was an anomaly and would never have lived. In examining, you felt a soft ballooned mass. With the finger-nail I ripped an opening and relieved a lot of fluid in that way. Then a second sac presented inside of the first one and was emptied in a similar way. This was the bladder. Every part of the child was edematous. This case was due to impermeability in the urethra of the child.

DR. JUDD (Rochester): These are certainly two very interesting cases. I had one case last year of an ulcer on the lesser curvature of the stomach. The patient was a boy 13 years old with a history of 2 or 3 years. It had not produced quite as marked symptoms as this one, although the ulcer was considerably larger than this one. I had the boy on Sippy treatment for two or three months and finally did just as Dr. Strachauer did. I think that is the youngest case we have seen of ulcer of the stomach.

I had a case of congenital hydronephrosis, a child 5 or 6 years old. We have laid so much stress in these cases on constriction of the ureter, but it seems to me that with the picture of this amount of destruction in the kidney tissue there must be some disease in the kidney itself. The kidney substance was pretty well destroyed, yet there was no evidence of obstruction. It seems to me we have not yet gotten at the etiology of hydronephrosis.

3. DR. LITZENBERG showed x-ray pictures of a hairpin which had been introduced into the uterus by the patient and which was removed by vaginal hysterotomy.

4. DR. JUDD (Rochester) reported two cases.

(a) Cyst of the Liver. 412606. M. A. B., male, 4 years of age.

History: The child was brought to the clinic Dec. 11, 1922. He had always been perfectly well until two weeks

previously, since which time he had frequently cried out in his sleep and complained of pain in his stomach. Never a hearty eater, but had never previously complained of any discomfort. No fever or jaundice. No known injuries of any kind.

Examination: Well-developed but rather thin, sallow boy. Submerged septic tonsils. Cervical glands enlarged. Reflexes exaggerated. Palpable mass 8x8.5 cm. in diameter in the epigastrium, movable in all directions. Lambis intestinalis and trichonemads present in stools. X-rays of the gastrointestinal tract negative. Hemoglobin 68 per cent; white cells 16,000; red cells 4,200,000. Urinalysis showed a specific gravity of 1045 and the presence of a slight amount of albumin. Blood Wassermann negative.

Operated Dec. 18, 1922. Tumor about the size of a small grapefruit beginning just beyond the suspensory ligament and involving the left lobe of the liver. Liver incised and cystic mass removed without rupturing it. Individual vessels tied and liver carefully sutured together. The tumor mass proved to be a multilocular simple cyst weighing 260 gms. Convalescence uneventful and patient able to leave the hospital the 13th day and was dismissed from our care 4 days later.

Examined Jan. 5, 1924: Patient had been crying out in his sleep during the past two or three weeks (period of holiday celebrations). When thoroughly awakened, the child did not complain of pain. Hemoglobin 72 per cent; white cells 12,000; red cells 4,650,000. No demonstrable abdominal pathology.

Discussion: This particular case is interesting because of the rarity of the condition and because it shows that a rather extensive operation on the liver can be carried out in a young child.

An accurate diagnosis of the condition could hardly be possible, as there were no indicative symptoms, simply the presence of a tumor. In most instances, the simple cysts of the liver have been multiple and have been associated with multiple cysts in the kidneys. Usually the cysts in the kidneys are extensive and their interference with the renal function may be the only complaint these patients make; there may be no palpable cysts in the liver. In this reported case, the liver was carefully examined and no other cysts could be found. The patient was examined recently, more than a year since his operation, and from all the evidence we could obtain, he is free from cysts in the liver or kidneys, and is well.

(b) Pancreatic Cyst. 392950. A. K., female, single, 54 years of age.

History: The patient came to the clinic May 30, 1922, because of the discovery of a tumor in the epigastrium two weeks previously. No pain or other symptoms from it. Had been constipated for many years. Five years previously she had had a sterile pleural effusion necessitating two drainage operations; in April, 1922, she had had a right-sided pleurisy confining her to the hospital for 10 days. For three or four years she had had marked intolerance of greasy foods and sauces, but no colic or jaundice. No weight loss.

Examination: Negative with the exception of a palpable mass in the epigastrium the size of an orange, which



moved on respiration. Low-lying but normal right kidney. Thickened pleura.

Operated June 13, 1922. Cyst of the pancreas near the head on the upper border with attachment about 3 inches in length, extending more on the posterior than on the anterior surface of the organ. The mass lay in the lesser peritoneal cavity just above the stomach and under the left lobe of the liver. A left rectus incision was made and the cyst enucleated by careful dissection without rupturing it. The pancreatic tissues were clamped superficially so that the ducts were not injured in any way. The abdomen was closed without drainage.

Discussion: In this instance the cyst was different than any other pancreatic cyst we have ever observed. In all the others, the cyst has been situated in the substance of the pancreas. The pancreatic tissue surrounded the cyst and an attempt to enucleate the cyst would have produced a great amount of bleeding, and rather than resort to excision under these circumstances, it has seemed a better policy to drain the cyst, suturing the wall of the cyst to the parietal peritoneum, thereby establishing drainage over a considerable period of time. These cases have done very well, although drainage in some individuals has persisted for a long time, sometimes many months.

In the case reported, the cyst probably should have been classified as a pseudo-cyst, as it was lying between the lesser curvature of the stomach and the liver and apparently arose from the extreme upper border of the pancreas. The entire cyst could be lifted out of the abdominal cavity and by clamping a few small attachments was removed. After these attachments had been tied off, the abdomen was closed without drainage. In every other respect the tumor was characteristic of a pancreatic cyst.

DR. H. B. SWEETSER read a paper entitled "Observations on Carcinoma of the Colon," with report of two cases.

#### DISCUSSION

DR. STRACHAUER: Malignancy of the bowel is one of the most satisfactory fields in surgery. Carcinoma of the bowel usually grows slowly and is very late to metastasize. Our operability of cancer of the bowel has been very much higher than has been reported by Dr. Sweetser. In fact, in our experience at the University Hospital, it has been the very rare exception that a tumor of the colon has been non-resectable. As to the types of operation to be performed, the indications for the Mikulicz and other types of resection are quite definitely laid out. All tumors of the right colon, that is the cecum, ascending colon and hepatic flexure, are preferably operated upon by the removal of the terminal ileum, cecum, ascending colon and hepatic flexure, an anastomosis being made between the ileum and transverse colon and the abdomen closed without drainage. The Mikulicz operation is indicated in all tumors of the left colon; that is, the transverse colon, splenic flexure, descending colon and sigmoid.

Primary anastomosis in the left colon is too frequently followed by leakage to warrant its performance. The Mikulicz operation is one of the safest and most satisfactory operations we are called upon to perform. By ade-

quate mobilization of the colon a very wide resection of the bowel and mesentery may be effected.

The account of a recent case operated upon at the University Hospital may be interesting. The patient complained of pain in the lower left abdominal quadrant two hours after meals. On palpation a tumor the size of a man's fist could be palpated in this region. At operation a carcinoma of the cecum, which had become adherent to the mesentery of the sigmoid, with extension of the malignancy into the mesentery of the sigmoid, was disclosed. A resection of the terminal ileum, cecum, ascending colon, and hepatic flexure with its fan-shaped mesentery, was performed and an end-to-side anastomosis made of the ileum to transverse colon. The sigmoid was freely mobilized and 14 inches of the same removed by the Mikulicz procedure.

These operations were done through a lower left rectus incision. When necessary to close the colostomy we have found that the same could be more easily performed by including in the closure a margin of the skin. In addition to this method of closure on the human, colostomy in a number of dogs was similarly closed, and we found, after killing the animals and removing the bowel, that the skin was still living and the hair growing into the lumen of the bowel.

DR. A. SCHWYZER (St. Paul): In regard to the diagnosis, I want to mention two cases we have had within a month. One was not carcinoma, but it was interesting as to the diagnosis; it was similar to that Dr. Sweetser has reported. The physician was not urging the operation, because the symptoms did not appear very urgent, and also on account of the patient's age. He had found that the lady, 68 years old, was suffering besides the constipation from insufficient action of the kidneys and weakness and fainting spells. However, there was a mass to be felt on deep palpation in the region of the upper ascending colon. It is difficult to understand why there was not a complete obstruction. There was at least 3 inches of an ulcerated and tortuous narrow channel through a thick carcinomatous mass larger than a man's fist. When water was poured into the cecum and the specimen held vertically suspended, the water would not run through this channel, but stay in the cecum above. An ileo-colic anastomosis was made after removing the whole mass under local anesthesia with  $\frac{1}{4}$  per cent novocain. The patient stood the local anesthetic quite well. She had broad adhesions and we had to remove a large package of glands that reached toward the root of the mesocolon. These glands, if they are soft and round and discrete, are as a rule only inflammatory and they felt inflammatory. Nevertheless, they were removed. The microscope showed they were only inflammatory. Just as Dr. Strachauer has found, I have seen few cases that really were inoperable. Not only when the lesion was in the right half of the colon but in almost every case I have made a direct anastomosis. One must always be careful not to drain near the suture line, and we use linen or silk on the outer side. I have done the Mikulicz operation in very debilitated old people. The upper part above the tumor is usually enormously hypertrophic. In this mentioned case, it was enormously so, and I think that was the reason why the patient did not have complete blocking.

The other case we had two weeks ago today. A woman, about 45 years of age, was brought in with complete obstruction. I have rarely seen an abdomen as tense as that one. The obstruction had lasted only two days. She had had repeated doses of laxatives, and seven enemas, with no results. In examining her vaginally, it was noticed that she had a hard mass at the right side in the Douglas. It seemed that it probably was a carcinoma above the rectum. It was thought best to first do just a small ileostomy through a gridiron incision at McBurney's point. We found absolutely collapsed small intestines. No ballooned loop presented. In feeling over toward the left side we found a very tense elastic mass. On its anterior surface we could feel a spread-out tinea, nearly an inch wide. This proved to be the colon. A midline incision was made and an enormous sigmoid was delivered. There was a twist of 360 degrees on the sigmoid flexure and the hard mass in the pelvis was a sub-serous fibroid of the uterus, which we removed. We put the lower part of the sigmoid on the stretch and then sewed it to the parietal peritoneum for a distance of about four inches.

The postoperative course in both cases was quite smooth. DR. JUDD (Rochester): There is one thing I would like to state again, to emphasize: the thing that we are constantly confronted with in a patient coming in with obscure abdominal symptoms. We have an x-ray of the colon and find carcinoma. These tumors may develop in an obscure way and grow to be very large before they give any evidence of lesion of the colon. Our experience with resection would be about the same as Dr. Miller at Hopkins. In operating for carcinoma of the right colon it seems to be a pretty radical procedure. You can very easily take out a segment and make an end-to-end or lateral anastomosis. It is safer to take out the coil and then join. I like to do an ileostomy at the same time. I used the Witzel technic; I put a catheter in and put a clamp on it. If there is no distention and the gas is expelled without difficulty, it may never be necessary to release the clamp from the end of the catheter and it may just be left in place until the catheter comes out of its own accord, in about 10 days. On the other hand, if there is distention, nausea, vomiting or paresis, it is well to free the clamp from the catheter and allow the gas and liquid feces to escape. This usually greatly relieves the patient. In the cases in which we have not used the catheter, it is seldom necessary to do a secondary operation for obstruction or paresis, but some patients have been distended a good deal and very sick for a number of days. This can be entirely relieved by the use of the enterostomy.

With carcinoma of the left colon, I think, as Dr. Strachauer says, they do represent a fairly satisfactory class, but they are primarily a big hazard and represent a higher mortality than the other resections. This has led us to do practically all cases in two stages. The patient may get along apparently all right for a week and then develop peritonitis, which it seems to me is explained by the fact that the circulation in the left colon is definitely distributed in segments. In one case the circulation may not seem to be greatly disturbed and the case gets along well, but in another case apparently done just as accurately and giving the same appearance at operation, the circulation

to one of the segments may be poor and the patient die as a result of necrosis in this portion of the intestine. In resections of the left colon, it seems to me the better plan is to do a radical Mikulicz operation if it can be done. With low tumors, it is sometimes very difficult to get the growth out well.

In operating for obstruction, it is better to do a complete ileostomy or a colostomy first, so that at the time of the second operation there will be practically a clean field. The colostomy enables us to wash out the lower segment and the performance of a clean operation.

DR. STRACHAUER: Dr. Judd's description of the blood supply to the colon is an explanation only in part for the failure of the colon to heal in primary anastomosis. We must recall that the colon is only partially covered by peritoneum and is not surrounded by a complete investiture as in the case of the intestine. Successful anastomosis of the bowel is absolutely dependent upon the apposition and adherence of serosa to serosa. This can not be accomplished in the posterior portion of the colon, which lacks the peritoneal covering. This, in addition to the blood supply, is the explanation of the common occurrence of leakage following resection and immediate anastomosis.

DR. SWEETSER (in closing): I just want to add a word. Of course, we understand that resection of the bowel for carcinoma carries with it a certain mortality which cannot be avoided by any method of operation. If, now, the mortality from resection and preliminary colostomy is no greater than that from the Mikulicz or two-stage operation, then, surely, from the standpoint of the patient, the former is the preferable method, as it gives a shorter and less distressing convalescence. That there is little difference in choice as regards mortality in the two methods may be seen by comparing the results in the respective series of Dowd and of Miller. Dowd had one death in 8 cases done by the Mikulicz two-stage method, a mortality rate of 12½ per cent; and Miller reports one death in 13 cases done by resection with preliminary colostomy, a mortality rate of 8 per cent.

DR. F. L. ADAIR read a paper entitled "Placental Infarcts and Their Relation to the Toxemias of Pregnancy," illustrated by several lantern slides.

#### DISCUSSION

DR. CONDIT: I would like to ask Dr. Adair how much of the mechanical element he can eliminate as an etiologic factor in the production of the injury to these placenta he describes in the plates as congestion, hemorrhages and even some of the thrombi. There may be marked damage done to the placenta at delivery from muscular contraction of the uterus alone, and more if delivery of the placenta is prolonged or Credé used in completing the third stage.

DR. LITZENBERG: Young, whom Dr. Adair quoted, and Dr. Adair's paper are two illustrations of two different kinds of minds approaching the subject. Young found so many cases of infarcts in the placenta that he came to the conclusion that it was the cause of the toxemia. I remember saying at a previous discussion of Young's paper in one of our departmental meetings that it seemed to me that one could come to the exact opposite conclusions from Young, using the same data. I think Dr. Adair has suc-

cessfully eliminated the etiologic factor from so many cases of toxemia that he had concluded, even though the toxemia was not always present, that the toxemia was the cause of the placental infarcts. I think that is a very reasonable conclusion to draw. I think that is a very reasonable conclusion to draw. I think that is a very reasonable conclusion to draw.

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cessfully refuted Dr. Young's contention that infarcts are etiological; and that they are more likely to be an effect from some unknown cause. Dr. Adair spoke of cases of toxemia that had no infarction. I have seen women who had convulsions who had no infarcts in the placenta. However, they occur so frequently in the toxemia of pregnancy that they must have some relation, although it is not a constant relation. Just what the relation is, it is difficult to say. We clinicians are apt to get impressions without very careful analysis. I have the impression that in the cases of pregnancy with a true nephritis infarction is very constant, but I think that it is a wise thing for us to pause and not to be carried away too far even by a man of Young's standing.

One other thing that Dr. Adair concludes that in the light of our present knowledge is quite logical, but which may at some future time be found to be not true. He says some of these cases are not toxic—one woman was "not definitely toxic, yet not just right." Sometime when we know more we may have a different idea. There may be women who are toxic who do not show the toxic symptoms as we think of them now. Some of these women may be mildly toxic that have these infarcts.

DR. HAMMOND (St. Paul): When I was in the maternity hospital in Montreal we used to keep pretty close track of the placenta and were particularly interested in infarcts. I think at that time we came to the conclusion that infarcts were almost always seen in cases where nephritis or high blood pressure were present or where there were definite signs of toxemia and we always looked upon the infarct as the result of kidney changes or toxemias. At that time we did not consider them as the cause of the toxemia.

I sent a rather interesting specimen over to the University today. The woman had gone overtime three or four weeks, according to her dates. The child was always more or less inactive. The fetal heart was rather indistinct, but definitely heard up to the time labor began. The woman went into labor; she had had some albumen but no signs of toxemia. At the time she went into labor the fetal heart was heard, but rather indistinct. There was a short normal first stage. At the beginning of the second stage the fetal heart was still more indistinct. In the course of two hours she was delivered. The child was dead. It was a very much under-nourished child, weighing six pounds. It was 54 cm. long, showing that it was overdue. The cause of the death of the child was a large infarct, at the insertion of the cord, which had gone on to cystic change. It shut off about half the circulation. There was no doubt about the cause of the death of the child in that case.

DR. LITZENBERG: I would like to ask Dr. Adair if he found any considerable number of fulminant cases that have no infarcts and also if there were any considerable number of cases of nephritis without infarcts.

DR. ADAIR (in closing): In answer to Dr. Condit's question, I would say that there are, of course, many changes seen in the placenta which cannot possibly occur in the short period of time elapsing between delivery of the child and delivery of the placenta. That a certain amount of congestion might result during the third stage is, I suppose, possible. That we could have congestion of the villi I

imagine is possible and yet I think a good deal of the congestion is on the fetal side, and after the child is delivered it would be rather difficult to explain why it should occur on the fetal side. It might be difficult to explain why this occurred only in localized areas. I really do not believe the retention of the placenta during the third stage to be much of a factor in causing these changes in the placenta.

With reference to Dr. Litzenberg's remarks, I showed some specimens from cases that gave no clinical signs of toxemia. This really is only indirect evidence that infarcts do not cause toxemia. The more conclusive evidence would be a rather marked toxemia without the presence of infarcts in the placenta. If we could demonstrate that, it would be almost conclusive evidence and I believe my specimens do show this. In many placenta you find old white infarcts.

In the fulminant cases of toxemia, infarcts are very common, especially these areas of recent degeneration and hemorrhage.

I think we find white infarcts especially in the more chronic cases, which would lend support to the idea that the white infarcts result from degenerative changes if the placenta remains long enough in the uterus.

In regard to nephritis, the two cases that I showed who had a high blood pressure evidently had previous hypertension with exacerbation during pregnancy. Whether or not there was any other cause is hard to tell. They both had various changes, both old and recent.

I have not seen a case such as that mentioned by Dr. Hammond, where an infarct obstructed the umbilical circulation. Extreme degeneration of the placenta is responsible for the death of the fetus. When a child outgrows the placenta, of course, it dies. This may account for some fetal deaths late in pregnancy. The child's growth continues as long as the normal placental tissue is able to meet its demands. If then the demands are not met, the child may die in utero.

JOHN E. HYNES,  
Secretary.

## TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD NOVEMBER 8, 1923, THE PRESIDENT,  
J. M. HAYES, IN THE CHAIR

Immediately before the regular meeting, the society presented Dr. A. W. Abbott with a small token of the respect of the profession which he has maintained through his fifty-five years of medical practice.

Dr. Farr made a concise presentation speech, as follows: Mr. Chairman, Members of the Minneapolis Surgical Society and guests:

Were it not for the realization of my almost total lack of ability to meet the requirements which have been imposed upon me by this society, the duty which is mine to perform would be one of the greatest pleasures of my life. I trust that any inadequacy on my part will melt into obscurity in your minds, which I know full well are surcharged with the consciousness that in honoring our es-

teemed confrère, Dr. Amos W. Abbott, we are honoring ourselves a hundred-fold.

Dear Doctor Abbott, we want you to know that we appreciate the fact that for fifty-five years you have been a potent factor in the growth and development of surgery; that you have been a leader in fostering medical progress; that your high medical and social standing have added greatly to the esteem in which our profession is held; that the enviable pinnacle upon which you stand today, after all these years on the firing line—years in which you were often tried but never found wanting—is constructed upon the qualities of honesty, integrity, perseverance and diligence, combined with an inherent modesty, love for your fellow men and the practical application of the Golden Rule. As an example to younger men your influence is undoubtedly the most marked of any with which I am familiar. Time will not permit the recounting of even a small portion of your attainments and yet from my own personal experience some indication of your qualities may be gained.

We all know something of your Civil War record. I have seen you meet adversity, which comes to all of us at times, with stoicism and without complaint. I have called you in council upon cases which I thought difficult only to learn that I needed a little more schooling. Upon each occasion I was instructed in such a manner that my respect and esteem for you increased—while the attitude of my patient towards me grew more respectful in a like manner. I have seen you during recent years remove a tumor, take it into your own laboratory, make frozen sections from it, dispute with a prominent pathologist regarding the diagnosis and win the debate. I well remember when, some years ago, I was seriously injured and taken to the City Hospital that you were the first of my medical friends to call upon me. I have borrowed money so often from you at medical conventions that during recent years your frequent voluntary offers of financial assistance have been the means of saving me great embarrassment.

And now, gentlemen, if close association, good fellowship and friendly contact are the cornerstones of steady and satisfactory advance, I feel that I bespeak the hearty conviction of each of us, that our association, whether close or remote, with Dr. Amos W. Abbott has been and always will be an elevating influence.

It is my extreme pleasure, therefore, to render you, Dr. Abbott, on behalf of the Minneapolis Surgical Society, while you are still with us in the full vigor of your health and mental faculties, this slight token of our appreciation.

Dr. Fred Olson presented a case of carcinoma of prostate.

The object of this report is primarily to bring before the society the frequency of early metastases along the tract of the thoracic duct in any genito-urinary malignancy; secondly, the apparent absence of local recurrence in the prostatic area. In this specific case, it is now more than three years after operation and there is comparatively complete control of certain secondary growths by radiation along the thoracic duct and its tributaries.

The patient, a male, aged 64, married, chiefly complained of difficulty and urgency in urination. He had had no

previous illness of importance. His general condition has been very good. He has noted increasing difficulty, frequency and urgency in urination during the last six months. No previous treatment. No gross changes noted in the urine.

**Examination:** Man of 5 feet 4 inches, apparently robust. Head and neck were negative. Heart shows some enlargement with a soft systolic murmur and accentuation of the second aortic sound. Systolic pressure, 180, diastolic 90 mm. Rectal examination shows a bilateral enlargement of prostate of about 2 on a scale of 1 to 4. Consistently uniform firmness throughout. There were 15 ounces of residual urine. The cystoscope revealed the usual picture of a large bilateral enlargement with trabeculated bladder, free from stone or infection. The urine, blood chemistry and phthalein tests demonstrated a moderate kidney insufficiency.

Preparation of patient by gradual decompression for ten days was followed by supra-pubic operation. The enucleation was easy and the wound dry in fourteen days, with an otherwise uneventful convalescence.

Microscopic section of the gland at time of operation was negative for malignancy.

A small area of adeno-carcinoma was demonstrated in the specimen at a subsequent examination seven months later, when an enlarged gland in the left cervical region was noted. The appearance of this gland gave the first indication of the malignant nature of the prostate. No urinary symptoms appeared nor is there any complaint on that score, today, three years after operation.

Cystoscopically the operative area and bladder are negative today.

The usual x-ray and radium therapy was employed locally and along the spine and cervical region.

The patient presents no demonstrable bony metastases. From time to time intense radiation with radium is given along sacral, lumbar and cervical spine with immediate relief of the recurring backache which is the patient's only complaint.

General condition of the patient is very good at the present time.

Dr. F. S. BISSELL (speaking by invitation) discussing treatment of Dr. Olson's case:

There is very little I can add except from the standpoint of technic. At the time I first saw the patient, both history and symptoms pointed strongly to metastases involving the retro-peritoneal lymph nodes and extending along the thoracic duct to the left supra-clavicular region. As usual in these cases the pain was constant and quite severe. An interesting and somewhat unusual feature of the case was the immediate relief which he experienced after each radium treatment.

Relative to technic it may be well to emphasize the factor of distance, which is of the greatest importance in cases like this one. By using a block of wood, one inch thick, between radium tubes and skin it is possible to greatly increase the percentage-depth-dose. This point needs to be stressed because there seems to be a rather general impression among medical men that radium technic is not important but that it is only necessary to apply



radium to the skin over the involved areas for a specified length of time.

The patient has not received any treatment for approximately one year and has been wholly free from symptoms or signs of further recurrence.

Dr T. H. Sweetser presented an interesting case of renal calculus.

This young man is twenty-three years old and single. During the last four years he has had repeated attacks of severe pain in the left flank and lumbar region radiating to the left shoulder and sometimes to the left hip and scrotum. Hematuria, pyuria, nocturia and polyuria have been noted during the attacks. He was first admitted to the Minneapolis General Hospital on July 13, 1923, during a similar attack. Physical examination showed generalized abdominal tenderness with rigidity of the left rectus muscle, tenderness over both kidneys, pain on percussion of both lumbar regions, and rigidity of lumbar muscles. The urine showed pus; leucocyte count was 10,000. Roentgenogram of entire area of urinary tract shows an oval dense shadow about 2 cm. in diameter medial to the lower pole of the left kidney and an irregular group of small shadows in the shadow of the lower pole of the same kidney. As his attack ceased promptly and he had no more discomfort he refused further investigation and treatment and left the hospital on July 20th feeling very well.

On September 5th the ambulance brought him in during a similar, but very severe, sudden attack. The physical signs indicated trouble on the left side only. At that time there was some specific urethritis, and as the patient was promptly relieved of his pain, cystoscopy was not deemed advisable and he was sent to the outpatient department on September 8th for treatment of the urethritis.

His last admission to the hospital was on November 15th during a similar but less severe attack. Cystoscopy on November 21st with the usual local anesthesia of the mucous membranes showed a little puffiness at the left ureteral orifice. An opaque catheter was passed easily up the left ureter, but the other catheter was arrested about 1 cm. from the right ureteral orifice, and attempts to go farther with different catheters failed. We felt that it was due to muscle spasm there. Roentgenogram, as you see, showed the tip of the left ureteral catheter touching the lower aspect of the large oval shadow previously seen; when pyelogram was attempted only a very little fluid filtered into the renal pelvis. The obstruction was, however, not complete, as we obtained some urine through the catheter; the sample contained a few erythrocytes and many leucocytes. Culture gave no growth.

Another cystoscopy was undertaken on November 26th under caudal anesthesia. Slight edema was noted at both ureteral orifices. Catheters passed easily up both ureters. Specimens showed occasional leucocytes and some erythrocytes. Cultures were negative. Phenolphthalein, given intravenously, appeared through the right side in three minutes and through the left in five minutes. In order to be sure of filling the renal pelvis this time, the patient was tilted back with the head down at an angle of about 40 degrees; the sodium iodide solution was run in by gravity as usual. These interesting pictures were secured.

You see that the left renal pelvis is greatly dilated, the calyces are flattened, and the stone shadows are all obliterated by the iodide solution. The right renal pelvis is slightly dilated but the calyces are not flattened.

Sixteen hours later this other roentgenogram of the entire urinary tract was made. There is no trace of the iodide solution on the right side, but on the left side the stone shadows, especially the small ones in the lower pole, stand out much more prominently than previously because a coating of sodium iodide stuck to them. It has been pointed out by different writers that sometimes a urinary calculus of about the density of the soft tissues may be discovered by just such a procedure, after it has escaped detection in a plain roentgenogram and in a pyelo-ureterogram.

Pyelotomy was performed on this patient on December 3rd by Dr. Oscar Owre. The largest stone was removed intact and smaller soft stones were removed from the lower calyx piecemeal. You may see that his wound is practically healed and that he walks quite well. He left the hospital on January 4th.

In addition to the history of this interesting condition, I wish to emphasize several practical points. First, occasionally an obstruction may be met about 1 cm. from the ureteral orifice, the obstruction being due solely to muscle spasm; second, cystoscopic examination in some patients is greatly facilitated by the use of caudal anesthesia; third, a procedure is described which helped us to secure a pyelogram in spite of a stone obstructing the outlet of the renal pelvis; fourth, the localization of shadows within the urinary passages may be proved by obliterating them with a pyelo-ureterogram, and by the fact that they may be brought into greater prominence in a picture taken a few hours after the pyelogram has been made.

Dr. E. S. Judd, Rochester, presented the paper of the evening. Subject: "Surgery of the Gallbladder." See page 161.

## PROGRESS

Abstracts to be submitted to Section Supervisors.

### MEDICINE

#### SUPERVISORS:

F. J. HIRSCHBOECK,  
FIDELITY BLDG., DULUTH

THOMAS A. PEPPARD,  
LA SALLE BLDG., MINNEAPOLIS

THE REACTION OF THE PARATONSILLAR TISSUES IN TONSILLECTOMY. A STUDY OF THE ETIOLOGY OF POST-TONSILLECTOMY PULMONARY ABSCESS: George Fetterolf, Herbert Fox. (Amer. Jour. of Med. Sc., Dec., 1923.) The authors have shown from a pathological study that the paratonsillar tissue after tonsillectomy is studded with thrombi which may be either sterile or septic, and that as a result of trauma, gapeis and muscular action these thrombi may be dislodged into the

superior caval circulation. Pulmonary emboli are therefore relatively frequent, and may escape notice on account of their small size, sterile character and prompt resolution. As a prophylactic measure they suggest that the routine use of deep transfixion sutures in tying the blood vessels be abolished, and that surface ties be used instead on account of the possibility of infection being carried more easily into the circulation through the transfixion of the thrombi in the vessels.

Inspiratory post-tonsillectomy lung complications are probably not as common as has been thought, and lymphatic transmission of the infection to the lungs they consider extremely rare.

A surgical procedure aiming at a diminution in the morbidity following tonsillectomy consists in their opinion in an intracapsular tonsillectomy as suggested by Makuen. They believe that in its perfected form it will tend materially to reduce the incidence of pulmonary complications following the operation, since the removal of the capsule with the tonsil as done at present removes an excellent bulwark to the infected nidus.

F. J. HIRSCHBOECK.

**THE CHRONIC APPENDIX-C:** Hamilton Whitehead. (*The Practitioner*, August, 1922. Page 155.) The author's classification of the diagnosis of chronic appendicitis is a convenient solution of diagnostic difficulties. The symptoms and pathological findings in so-called chronic appendicitis are discussed at length. The writer's conclusions are:

1. The enormous number of patients whose abdominal ailments are now diagnosed as chronic appendicitis chiefly consist of symptoms of widely varying causation and for which symptoms, the appendix is not responsible.
2. The symptoms attributed to the chronic appendix are not explained by the pathological findings and are not cured by removal of the appendix.
3. The operation for removal of the chronic appendix not only fails to cure, but frequently makes the patient worse.
4. Attribution to the appendix of abdominal discomfort of obscure origin hinders investigation into the causes of abdominal pain.
5. In the surgeon, the chronic appendix theory produces laxity in diagnosis and in operating, and incisions are made so small that thorough examination of the abdominal contents is made a mechanical impossibility.
6. In the layman, the operation for the removal of the chronic appendix, because of its failure to cure and because of its after effects, is producing doubt about the necessity for operation in acute appendicitis and mistrust in the bona fides of the surgeon.
7. The chronic appendix theory judged by the test of the ability of the operation for removal of the appendix to rid the patient of his symptoms, is found wanting.
8. In the interest of surgeons and patients the diagnosis of chronic inflammation of the appendix as a condition requiring operation should be abandoned.

PAUL H. ROWE.

## SURGERY

### SUPERVISORS:

DONALD K. BACON,  
LOWRY BLDG., ST. PAUL  
VERNE C. HUNT,  
MAYO CLINIC, ROCHESTER

### RESULTS IN GALL-BLADDER SURGERY: F. N. G.

Starr (Surg., Gyn. and Ob., September 1923). Gall-bladder disease may mean many degrees of inflammation as well as stone formation.

As a life saving measure, drainage or a more radical surgical procedure is considered in the following conditions:

1. Acute inflammation without jaundice.
2. Acute inflammation with cystic duct obstruction.
3. Acute inflammation with rupture of the gall-bladder. (Rare—occurred only three times in 450 cases.)
4. Acute inflammation with so much associated thickening of the duct that obstruction occurs with jaundice.
5. Acute inflammation with common duct obstruction from stone causing jaundice.

The procedure to be followed in these conditions is, first to choose a suitable time, then follow a plan destined to relieve the acute condition, rather than make a brilliant operation. Further restorative measures can be thought of later.

From the economic aspect, distressing symptoms of right costal margin pain with radiation, gas distress, qualitative food distress, constipation, and diarrhea with upper abdominal distress and mucus in the stools should be relieved by operation.

Thirty-two and four-tenths per cent of the author's patients suffered with constipation, and cholecystectomy relieved 72 per cent of them. In cases of diarrhea (29 per cent) the staphylococcus aureus was found in the gall-bladder. Sixty-five and one-half per cent of these have been relieved of the so-called mucous colitis by cholecystectomy.

We should aim to prevent acute conditions, chronic pancreatitis, hemorrhagic pancreatitis, and carcinoma resulting from continued irritation in these cases.

A method of procedure with a medical régime is advisable in some cases, and in others careful pre-operative observation and preparation, proper choice of anesthetic, proper operative technique and postoperative régime is given.

The author closes by stating that if gall-bladder surgery is instituted soon after the first symptoms develop, the mortality is negligible, the disaster of complications is avoided, and the efficiency of the individual as an economic asset is improved, as about 66 per cent of these patients are cured and 34 per cent are relieved of most of their symptoms.

W. P. HERBST.

## THE RADICAL OPERATION FOR TERATOMA

TESTES: Frank Hinman, Thomas E. Gibson, Adolph A. Kutzmann (Surg., Gyn. and Ob., Vol. 37, October 1923). This paper is a study of eighty-three cases of testicular tumor in which radical operations were performed, including removal of the lymphatic drainage tissues.

The present radical operation has developed as a result of the work on the lymphatic system of the testicle by Most in 1899. He demonstrated that the primary lymph nodes of the testicle were retroperitoneal along the aorta and vena cava in the lumbar region, at the site of embryological origin.

Pathologically there are two current views. Chevasu maintains that there are two groups—the mixed tumors of the testicle, and a large group of unicellular tumors of malignant nature arising from the epithelium of the seminiferous tubules, called "seminoma." Ewing states that all testicular tumors are teratomatous in origin, and the authors incline to this view.

The diagnosis of malignancy of a testicular tumor is so difficult and uncertain that any testicular enlargement demands surgical inspection and microscopic study. The growth may be masked by hydrocele. Four cases had a radical operation performed for gummata and massive tuberculosis because a careful examination was not made before proceeding with the radical operation. All ages are affected but most commonly between twenty and fifty. The duration or nature of the tumor does not help in indicating the presence or absence of metastases. There is a relatively greater occurrence of malignancy in cryptorchids.

The prognosis of patients with tumors of the testicle is very poor. The seminoma growth is less malignant than the teratoma. Only about 15 per cent of patients on whom orchidectomy has been practiced have been cured. This fact has led some to advocate radiation as the treatment of testicular tumors, as in some cases it has accomplished phenomenal results.

The operation which the author advises has raised the number of cures by surgery from 15 to about 30 per cent, with an operative mortality of 9 plus per cent.

In treating these cases the operable cases are all treated radically. The inoperable cases, which are made up of the groups in which malignant masses retroperitoneally are found and cannot be removed, and those in which masses are palpable through the abdominal wall when examined, are treated by radiation. When these masses are discovered at the time of exploration, radium is inserted at that time, or later through tubes left in as for drainage.

The technical steps of the radical operation are described in detail and illustrated. Briefly they are as follows: Positioning of patient with side turned a little to opposite side, exposure and clamping of the cord through an inguinal incision; delivery of testicle followed by cautery castration and clamping; laboratory examination; extension of incision parallel to twelfth rib. The peritoneum is then separated opening in the iliac fossa to expose the large abdominal vessels, followed by division and ligation of spermatic vessels at their origin, resection of gland-bearing area from below upward, exposure of retroperitoneal and iliac area to permit radium radiation on operating table, placing of rubber

tubes for drainage, and radium therapy at the back or upper end of the wound.

The author (Hinman) ligated the inferior mesenteric artery in one case in order to make a clean removal of the glands. This patient died of acute cardiac dilatation a few hours after operation, so that the efficiency of the collateral circulation of the human could not be determined. In cats and dogs this artery can be ligated with no bad effect.

The authors have many excellent detail-giving tables on the cases and an extensive bibliography.

W. P. HERBST.

POSTOPERATIVE INFECTIVE PAROTIDITIS: William H. Fisher (Annals of Surgery, Vol. 77, November 1923). Parotitis, following operations on distant parts of the body, is classified according to the severity of the inflammatory process in the parotid gland as follows:

1. Acute parotitis.
2. Acute suppurative parotitis.
  - (a) Circumscribed.
  - (b) Diffuse parotitis.
3. Gangrenous parotitis.

Acute parotitis or simple inflammation occurs usually three to five days after operation. It is characterized by a swelling of the gland and the usual symptoms of any infectious disease. In three or four days this condition usually subsides. Iodine and ice applications are used to most advantage.

Acute suppurative parotitis is characterized by pus formation with an accompanying increase in severity of systemic and local symptoms. Pus can usually be expressed from Stensen's duct when no obstruction exists. Occlusion of the duct by a stone should be ruled out by passage of a probe. A single localized abscess usually recovers by maintaining drainage through Stensen's duct. In cases in which there is a diffuse process the general symptoms are much exaggerated and there is immense swelling of the face, dysphagia, meningeal disturbance, chilling, and leukocytosis.

If there is not free and satisfactory drainage of pus from Stensen's duct the gland should be exposed by a V incision. This incision is made from the zygoma anterior and close to the tragus, down along the sternocleidomastoid muscle. Then a 2½-inch curved incision is made from the mastoid to join the original incision.

These cases that do not do well may have pus burrow to the supraclavicular region, follow the sheath of the vessels to involve the mediastinum or form a retropharyngeal abscess. The mortality in these cases is about 30 per cent.

Gangrenous parotitis is rare, but invariably fatal when it does occur. In these cases all the symptoms are more severe and the pressure of the unyielding parotideo-maseteric fascia causes rapid gangrene. The surrounding structures become involved by the gangrene and death results from septicemia.

The author cites cases to illustrate the different types of parotitis with the proper treatment.

W. P. HERBST.

**CHRONIC CHOLECYSTITIS WITHOUT STONE:**

Frederic W. Bancroft. (Ann. of Surgery, Nov., 1923.) This is a study of thirty-eight consecutive cases of cholecystitis without stones in which the history, pathology, and late results have been analyzed.

Four methods of infection of the gall-bladder are mentioned as follows:

1. A descending bile-borne infection from the liver.
2. An ascending ductile infection from the duodenum.
3. A hematogenous infection.
4. A spreading infection to the wall of the gall-bladder through the lymphatics from an inflamed contiguous organ.

Twenty-four women and 14 men made up the series of cases. The age at the time of operation was 36 in both men and women, and the average duration of symptoms was 2½ years.

The usual complaint was pain and soreness in the epigastrium or right upper quadrant with indigestion and gas persisting over a considerable period of time. Eleven women and 5 men had had previous operations for lower abdominal inflammatory conditions. Twelve of the patients operated on had definitely diseased appendices, which were removed at operation. This makes 28, or 73.7 per cent, of the cases with associated infection elsewhere.

Upon physical examination the following was found:

Adiposity: Usually moderate amount.

General appearance: Usually not sick.

Tenderness at Murphy's point on deep pressure: Present in 35, absent in 3.

Rigidity: Moderate degree, 9; marked, 4; absent, 25.

Lyon test: Positive in the nine cases in which it was used.

The ante-operative diagnosis in these cases were: Cholelithiasis, 13; cholecystitis, 15; adhesions about duodenum, 4; ulcer of stomach, 2; not mentioned, 2.

Cholecystectomy was done in 31 cases and cholecystostomy in 6 cases. The appendix was removed in 20 cases and found diseased in 12.

The gall-bladders removed were carefully studied microscopically and two pathological types were observed which may or may not have been various stages of the same disease. In one type the mucosa and villi were relatively normal but the submucosa was thickened and there was round cell infiltration in the muscularis and submucosa. In the other type, the so-called strawberry gall-bladder, there were coarsely shaped villi and ulceration of the tips, with scar tissue formation, round cell infiltration, and lipid deposits in the villi. Boyd found that normal gall-bladders contained 1.70 per cent cholesterol, and that strawberry gall-bladders contained 50 per cent cholesterol.

According to Chauffard small biliary calculi originate inside the villi as minute clusters of cells surrounded by cholesterol. These are shed, then increase in size and ultimately become faceted.

Cholecystectomy resulted in 88.5 per cent cures and cholecystostomy in 50 per cent cures.

The article contains eleven photomicrographs illustrating the normal and diseased gall-bladder conditions.

W. P. HERBST.

**PEDIATRICS****SUPERVISORS:**

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MANKATO CLINIC, MANKATO

**AN EFFICIENT TREATMENT FOR RESISTANT CASES OF PYELITIS:** J. Spencer Davis (Arch. of Ped., October 1923). All authorities are agreed that the disease is much more frequent among females and that the colon bacillus is the most frequent organism found although a mixed infection may be present and occasionally other organisms are the only ones in evidence. In some cases of recurrent pyelitis, specimens of urine obtained by catheter in absence of clinical signs have yielded cultures of colon bacilli. It is apparently in this type of case that an intercurrent affection such as coryza will precipitate an attack of pyelitis. Constipation seems also to play a role at times and the child will escape an attack as long as the bowels are kept active.

**Treatment:** Some writers prefer alkaline treatment while others alternate urotropin and acid sodium phosphate with alkalis.

**Vaccines:** For the relief of symptoms, vaccines sometimes play a role but their curative properties are doubtful. For the past ten years injections of whole blood unaltered by anticoagulants was used in the treatment of these cases which did not yield to medication. An attempt was made to determine the smallest quantity of blood which would prove effective. This was found to be 20 c.c. In the severer types of recurrent infections, this was found to be inadequate and larger quantities up to 100 c.c. had to be given. After the injection no medication was given.

**Reaction:** In some cases it was noted that the patient would have a chill a few hours after the injection followed by profuse perspiration and a fall in temperature, frequently to normal. If the temperature did not reach normal in thirty-six hours, a second injection of blood was given.

**Effect on Child's Blood:** In a few hours after the injection there is a prompt rise in the leucocyte count, if it is not already high. In some cases, with marked improvement in twenty-four hours the rise in leucocyte count persisted while in others it declined, especially when there was marked decrease in the number of bacteria in the urine.

**Effect in the Urine:** In cases showing improvement, the number of bacteria was decreased without necessarily an decrease in the number of pus cells. The pus cells were found in decreasing numbers for several days after the child was clinically well.

**Relapse:** Out of a group of fifty cases, thirty-five were selected which were followed for from three to five years. These were all severe cases, many of which had had several attacks. In only one was found a recurrence. The case, about two years after an attack which was treated above, had a recurrence and developed a perinephritic abscess.

R. N. ANDREWS



**AN EFFICIENT TREATMENT FOR RESISTANT CASES OF PYELITIS:** J. Spencer Davis. (*Arch. of Ped.*, Oct., 1923.) For the past ten years Spencer has used injection of whole blood unaltered by anticoagulants in the treatment of cases which did not yield to medication. Twenty cubic centimeters was customarily given although in the severe types of recurrent infection larger quantities up to 100 c.c. were given. The greatest number of injections has been five, but in many cases a single injection was all that was necessary. After the injection no medication was given. Occasional systemic reactions occur associated with a definite leucocytosis. Of thirty-five severe cases observed from three to five years, only one relapse occurred.

C. A. STEWART.

**THE RELATION BETWEEN CHRONIC TONSILITIS AND ACUTE KIDNEY INFECTIONS:** D. Leasesne Smith and C. Williams Bailey (*Arch. of Ped.*, August, 1923.) Kidney infections are common complications of the acute infectious diseases, and the primary focus of infection is then a foregone conclusion. But when the primary symptoms are referable only to the kidneys, the case assumes an entirely different aspect. It is generally thought that acute nephritis and pyelonephritis are secondary infections. Also it is generally known that, as in acute rheumatic fever, the symptoms of the secondary infection may completely overshadow those of the primary or the primary infection may be producing no known symptoms. Both primary and secondary infections may or may not clear up spontaneously. In any event, if the primary focus is removed, the secondary trouble will usually disappear if the parts secondarily infected have not been permanently and organically disabled.

Now the tonsils are perhaps the most common avenues of infection; consequently, in a seemingly primary acute nephritis or pyelonephritis, it is logical, first, to suspect that the tonsils are responsible for the entrance of the infecting organisms. If then upon this suspicion the tonsils are found chronically infected and no other focus can be found, it is reasonable to conclude that the tonsils are the primary seat of the disease, the diagnosis being then chronic tonsillitis complicated by acute nephritis or pyelonephritis, as the case may be. In such cases why not immediately remove the tonsils right in the acute stage of the kidney disorder? If in time the acute symptoms subside and the patient recovers, all is well. But if time is allowed, and the kidneys become permanently damaged, the patient may be beyond any help. Many cases of acute appendicitis recover spontaneously, but is it ever advisable to take the chance and wait?

When only the colon bacillus is found to be the infecting organism in acute pyelonephritis, the findings usually indicate less kidney substance involvement and more pelvis inflammation. In these cases the tonsils probably cannot be incriminated as the chief offenders. The more exact method of diagnosis would be to make cultures of the tonsils, blood, and urine. If the organisms are the same in all three, or if tonsils and urine contain the same organisms, the connection is apparent. The removal of the tonsils at the acute stage was well borne by all the cases.

R. N. ANDREWS.

**EXOPHTHALMIC GOITER IN CHILDHOOD WITH SOME UNUSUAL MANIFESTATIONS:** Henry Heiman, New York (*Amer. Jour. of Dis. of Child.*, September, 1923). Sex distribution shows a definite preponderance of females. The ultimate cause of the disease must act primarily or secondarily through the involuntary nervous system. Heredity has played an important rôle in a large number of reported cases. In none was there any history of syphilis. The structure of the thyroid gland and its pathology have been clearly described by Marine. Uniform enlargement of the thyroid may be produced by a hyperplastic or a colloid gland. In the former, the epithelium is higher and the walls of the alveoli may be thrown up into plications. There is increased blood vessel supply and at times round-cell infiltration of the stroma. The colloid is diminished. In the colloid gland, there is a formation of large amounts of colloid material which stretch the alveolar spaces and produce a flattened epithelium. There is marked thickening of the walls of the blood vessels.

The cardinal symptoms of exophthalmic goiter are tachycardia, exophthalmos and enlarged thyroid gland. The most important diagnostic test is an increased basal metabolism. The exophthalmos is usually less marked in children than in adults, but its presence is generally definitely observed. Graefe's and Stellwag's signs were present in all our cases. The basal metabolism test has proved to be the most important guide in diagnosis as well as in the determination of the severity of the disease. The results in the three cases before treatment were: First case, plus 12 per cent; second case, plus 20 per cent; third case, plus 52 per cent. Clinically, the degree of severity of the symptoms and signs corresponded with the degree of elevation of the metabolic rate. Osler believed tremor to be one of the cardinal symptoms, but in childhood it has not been frequently observed. Alertness and irritability were present in all cases. The mentality of the children was above the average.

In the light of all recent evidence regarding treatment, it seems the most rational procedure to institute first a regimen of strict physical and psychical rest for six to ten weeks. If the patient shows no improvement, a short period of roentgen ray therapy should be tried. Thyroidectomy should be performed if there is no response to the roentgen ray. On account of the toxic action on the heart in the severe cases, it is safer not to wait too long before operation.

R. N. ANDREWS.

**CHRONIC ULCERATIVE COLITIS IN CHILDHOOD:** Henry F. Helmholtz. (*Amer. Jour. of Dis. of Child.*, Nov., 1923.) A careful search of the literature has failed to reveal a single article dealing with chronic ulcerative colitis in childhood. Although different in their mode of onset, when fully developed these cases appear to be the same, the chronic recurring dysentery with watery, bloody passages, marked emaciation, persistence of the symptoms in spite of treatment, and the absence of any known etiologic factor. Chronic ulcerative colitis, as defined by Logan, is a chronic inflammation of the large bowel, of unknown etiology, and showing all grades of inflammation, from a reddened, congested, easily bleeding mucous membrane, to

superficial and deep ulceration, with constant or recurring dysentery, lasting from many months to several years.

So far as is known, there is no single definite etiologic factor in chronic ulcerative colitis. The condition may be the result of a variety of infections, pyogenic, dysenteric, amebic or tuberculous; but wherever a specific cause can be demonstrated, the condition is usually not considered chronic ulcerative colitis.

The ulceration begins in the lower portion of the bowel, and in the course of the illness the entire colon is involved. Only rarely is the ileum involved. On proctoscopic examination, the ulcers are usually most marked in the rectum and lower sigmoid, and in the early cases become less numerous in the sigmoid. The colon is usually thickened, the surface appearing red and glazed, with numerous small ulcers. In the severe cases, only small islands of mucosa are left, the entire surface being ulcerated, and presenting a granular appearance. The roentgenogram is characterized by marked narrowing and absence of haustrations in the full extent of the involved colon. Large hemorrhages occur only occasionally in the adult, but seem to be more frequent in the child. If there is no complication, the patients are usually free from fever.

Under medical treatment, the outlook is bad. Logan gives a mortality of 7.5 per cent in his cases. All of the four patients in the series did poorly under medical treatment alone, and only two improved after surgical intervention. In two cases a colostomy, in the third an appendicostomy, and in the fourth an ileostomy (Brown operation) was performed, by means of which the lower bowel could be constantly irrigated with saline solution. Recently Logan has reported several cases in which the patients improved markedly under massive doses of iodine by mouth. If the patient does not improve in the course of six weeks or two months, under medical treatment, it is advisable to operate. The operation of choice is unquestionably the one devised by Brown, consisting of an ileostomy with the establishment of a complete fecal fistula, through the lower loop of which the colon can be irrigated.

R. N. ANDREWS.

## GYNECOLOGY AND OBSTETRICS

### SUPERVISORS:

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L. W. BARRY,  
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THE TREATMENT OF GONORRHEAL ENDOCERVICITIS BY HEAT: Budd C. Corbus and Vincent J. O'Connor. (Surg., Gyn. and Ob., Vol. 38, January, 1924.)

Many methods have been tried for the cure of gonorrheal endocervicitis. Failure has been due to a lack of definite knowledge of the pathology and inaccessibility of the affected parts to topical applications.

Curtis has shown by histological and cultural examina-

tions: the infrequency of chronic endometritis; the rarity of gonococci in fallopian tubes removed from patients free from leucocytosis and fever for a period of ten days or two weeks; sections of cervixes very frequently show gonococci.

Persistent tubal gonorrhea results from the recurrence of an infection from without or more commonly from repeated invasions from a chronic lower genital tract infection.

Gonococci localize in the cervical glands and are the predisposing cause of purulent endocervicitis and leucorrhea.

Utilizing the well-known fact that gonococci are instantly destroyed at a temperature of 113° F. (45° C), the authors have devised an electric thermophore for introduction into the cervical canal. By this device a constant temperature of 116°-117° F. is maintained for 30-40 minutes without pain or discomfort to the patient. Treatments are repeated at seven or ten day intervals. The treatment causes a rapid healing of cervical erosions and the purulent cervical discharge quickly assumes a watery character. Treatments are continued until the gonococcus is absent from five successive smears.

After an elapse of two months, 5 per cent silver nitrate is applied endocervically. With two negative smears the patient is pronounced cured.

In twenty-two cases the gonococcus disappeared permanently from the cervical discharge; after one treatment, five cases; two treatments, seven cases; three treatments, four cases; four treatments, two cases; seven treatments, four cases.

Contraindications to treatment are pregnancy, acute pelvic cellulitis and salpingitis.

L. W. BARRY.

## ROENTGENOLOGY

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PULMONARY ABSCESS ROENTGENOLOGICALLY CONSIDERED: W. H. Stewart (Jour. of Radiology, Page 277, August, 1923). The causes of pulmonary abscess in the order of their frequency are tonsillectomy, pneumonia, lobar or lobular, other operations, inhalation of foul water while bathing, sacculated empyema breaking through the visceral pleura. A primary abscess may occur with pneumonia as a secondary manifestation.

Most abscesses may be diagnosed clinically. The x-ray is chiefly valuable for localizing the abscess, determining its extent and the presence of associated lesions. The early appearance is that of an oval-shaped localized pneumonitis. With the development of cavitation a lighter area appears within the zone of infiltration. The cavity may be filled with fluid giving a homogeneous shadow; or it may be partly filled showing a fluid level.

Roentgen diagnosis of abscesses and empyemas actually requires the absence of the usual signs of pneumonia, the lack of a cavity and the absence of indurated areas.

The auscultatory signs of empyema are in sweet breath with the posterior, ment. The roentgen interval localized fluoroscopic which respiration

LOCALIZATION OF ABSCESS: Mains, November 1923. The work was given over to inoculation of auto-graft was removed same method, takes, w grafts g radiated on the r were do ods. Th selves, c not hin immedia The wor controls These i destruct

Röntgenologically, the most common mistakes are the diagnosis of one abscess when there are a number of smaller ones; and diagnosing abscess when sacculated empyema is actually present. The latter can best be distinguished by the absence of foul sputum. Air bubbles appearing in an encapsulated empyema may be due to a bronchial fistula or to needling. Tuberculous cavities can be distinguished by the lack of infiltration about them, their position, the laboratory findings and the presence of other areas of tuberculous infiltration. Sarcomata are very difficult to diagnose.

The author advises drainage by means of repeated bronchoscopy as the best form of treatment. If necessary, injections of silver salts or bismuth subcarbonate suspended in sweet oil should be given. Frequent roentgen studies, with the patient in the prone lateral position and the tube posterior, should be made to check the results of treatment. The cases with much infiltration and little softening do not respond well to bronchoscopic treatment and surgical intervention is advised. The abscess must be accurately localized for the surgeon and is best done with the hand fluoroscope on the operating table, to avoid the errors which result from slight changes in position or in phase of respiration.

LEO G. RIGLER.

**LOCAL RESISTANCE TO SPONTANEOUS MOUTH CANCER INDUCED BY X-RAYS:** J. B. Murphy, J. Maisin, E. Sturm (Jour. Exper. Med., Vol. 38, p 645, November 1923). In a previous paper, Murphy and his co-workers have shown that an erythema dose of x-rays given over an area of skin renders this area highly resistant to inoculation with transplantable cancer. To make this work more convincing, further experiments were done using auto-grafts from spontaneous mouse tumors. The tumor was removed from the mouse and an area in the flank was exposed to an erythema dose of x-rays. Portions of the removed tumor were then inoculated in both flanks of the same mouse. On the radiated side there were 16 per cent takes, while on the non-radiated side 71 per cent of the grafts grew. All the growths which did occur on the radiated side were smaller and slower growing than those on the non-radiated side. Two further sets of experiments were done using the same experimental and control methods. These showed that radiation of the tumor cells themselves, either in vitro or in situ after transplantation, did not hinder their growth or prevent transplantation, if immediately transplanted to a different non-radiated area. The work was done on enough cases and with sufficient controls to warrant careful consideration of the results. These indicate that the retardation in growth and the destruction of mouse tumors, which occur after an erythema

dose of x-rays, is not due to the specific effect upon the tumor cells, which is generally believed, but rather to an effect upon the normal tissues in which the tumor is implanted. The authors do not believe the results of x-ray therapy on cancer can be due to greater susceptibility of tumor cells, but rather to the change induced in the tumor bearing tissue.

LEO G. RIGLER.

**PERICARDITIS WITH EFFUSION:** Hodges (Jour. Rad., October 1923). Acute pericardial effusions are most often due to acute articular rheumatism, pneumonia, or other infections. Chronic effusions are uncommon and are most often due to tuberculosis. The fluid may vary in amount and may be serous, sero-fibrinous, sero-purulent, or hemorrhagic. Pain is the chief symptom and the pericardial friction rub is the chief diagnostic point in small effusions. The author considers the only physical signs of value in the larger effusions to be, the friction rub, extension of the cardiac dullness upward on the left, substernal dullness changing with change in the position of the patient, broadening of the cardiac area, signs of compressed lung at the angle of the left scapula, and pushing down of the left lobe of the liver. Roentgen examination is useful, when there is more than 200 c.c. of fluid, to determine the presence of fluid, its extent, location for paracentesis, and to distinguish pericardial effusions from pleural effusions and from consolidations of the lung. There is a difference of opinion amongst clinicians and roentgenologists as to the value of the roentgen ray, especially in distinguishing pericardial effusions from dilated hearts. The author studied sixteen cases of pericardial effusion, in five of which the diagnosis was not made by the roentgenograms. In four of these there was less than 200 c.c. of fluid. The findings were as follows: widening of the mediastinal shadow; a bulging of this shadow upward and to the left; widening of the heart shadow; obliteration of the curves of the borders of the heart; extension of the mediastinal borders as more or less straight lines up to the clavicles; change in the contour of the cardiac shadow with change in the position of the patient; weakened cardiac impulse. In the presence of adhesions the mediastinal shadow may show little change. In the presence of large pleural effusions the diagnosis may be difficult. To differentiate it from dilated heart, mediastinal effusions and tumors, the most valuable sign is the change in the contour of the heart with change in position of the patient. The diagnosis is of importance as paracentesis may be a life saving measure. Negative diagnoses in the presence of fluid are more excusable than positive diagnoses in the absence of fluid.

LEO G. RIGLER.

## BOOK REVIEWS

## BOOKS RECEIVED FOR REVIEW

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES FOR THE FISCAL YEAR 1923. 316 pages. U. S. Government Printing Office, Washington, D. C., 1923. Cloth, \$0.75.

THE ROCKEFELLER FOUNDATION. ANNUAL REPORT FOR 1922. 419 pages. Illustrated. New York: The Rockefeller Foundation Press, 61 Broadway.

INTERNATIONAL CLINICS. Edited by Henry W. Cattell, A.M., M.D., Philadelphia, in collaboration with others. Volume IV, 33rd series, 1923. 308 pages. Illus. Philadelphia and London: J. B. Lippincott Co., 1923.

SEWAGE TREATMENT IN THE UNITED STATES. Report on the Study of Fifteen Representative Sewage Treatment Plants. H. H. Wagenhals, E. J. Theriault and H. B. Hommon. Prepared by direction of the Surgeon General. 260 pages. Washington, D. C.: Government Printing Office, 1923. Paper, \$0.50.

LECTURES ON ENDOCRINOLOGY. Walter Timme, M.D., Attending Neurologist Neurological Institute, N. Y.; Professor of Endocrinology, Broad Street Hospital; Professor of Nervous and Mental Diseases, Polyclinic Medical School and Hospital. 123 pages. 27 illus. New York: Paul B. Hoeber, 1923. Cloth, \$1.50.

HERNIA. Leigh F. Watson, M.D., Associate in Surgery, Rush Medical College, Chicago. 660 pages. 232 illus. St. Louis: C. V. Mosby Co., 1924. Cloth, \$11.00.

PRACTICAL CHEMICAL ANALYSIS OF BLOOD. Victor C. Myers, M.A., Ph.D., Professor and Director of the Department of Biochemistry, N. Y. Post-graduate Medical School and Hospital. 2nd edition. 232 pages. Illus. St. Louis: C. V. Mosby Co., 1924. Cloth, \$5.00.

MANAGEMENT OF THE SICK INFANT. Langley Porter, B.S., M.D., M.R.C.S. (Eng.), L. R. C. P. (London),

and William E. Carter, M.D., Assistant in Pediatrics and Chief of Out-patient Department, University of California Medical School, Attending Physician, San Francisco Hospital. 2nd edition. 659 pages. Illus. St. Louis: C. V. Mosby Co., 1924. Cloth, \$8.50.

GENERAL MEDICINE. Vol. I. The Practical Medicine Series. Edited by George H. Weaver, M.D., Lawrence Brown, M.D., Robert B. Preble, A.M., M.D., Bert W. Sippy, M.D., Ralph C. Brown, B.S., M.D. Second edition. 1923. Chicago: The Year Book Publishers.

The 1923 Volume of General Medicine in the Chicago Practical Medicine Series conforms to its past high standards. Perhaps the most valuable single asset in this review is the accuracy and brevity with which the various subjects are handled. There are some outstanding features that deserve special notice. The article on diseases of the blood is very interesting. The pathogenesis of pernicious anemia receives considerable attention, but progress in this direction does not seem to have been made. The suggestion that reactions following blood transfusions may be allergic, arresting and within the last year has received more attention. Perhaps one of the most readable reviews in the volume is the one showing clinical charts which are recommended by the Association for the prevention of relief of heart disease. These are worth careful study and their use would probably do much to eliminate the occurrence of cardiac lesions. There is a review of the treatment of asthma which does not advance our knowledge of this subject much further than it has already been done by Walker and others.

One would like to pick out further examples of concise narration covering interesting facts recorded in the past year; these, however, merit a direct reading of the volume. The few instances recorded above have been given with the hope that they would awaken interest in the book itself.

EDGAR T. HERRMANN, M.D.

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FOR SALE—To close an estate, good location for practice in St. Paul. No other physician in same vicinity. Excellent opportunity; will bear close investigation. Address B75, care of MINNESOTA MEDICINE.